THE WELDING ENGINEER

OCTOBER, 1950

IN THIS ISSUE: **Convention Preview, Metal Show**

A McGRAW-HILL PUBLICATION

MODEL
AA•1

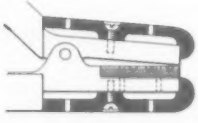
electrodes through 1/4", 300 amps.
Price $6.00, lower in quantity

MODEL
AA•3

electrodes through 3/8", 500 amps.
Price $7.50, lower in quantity

MODEL
AA•3S

electrodes through 3/8", 500 amps.
with larger handle for greater ventilation
Price $8.00, lower in quantity



Something new has been added to these three Jackson Electrode Holders.

Not only are their tongs made of a heat treated superior 98% copper alloy—

Not only has it been proven in tests that these Jacksons have extra *tensile strength*, extra *hardness*, and extra *conductivity* over other makes of copper alloy holders—*but* . . .

The latest "EXTRA" is in the lower jaws that are now made *replaceable*, without having to replace the entire lower tong.

For no matter how strong we make them, it's the lower jaws that have the grooves to grip the rods, and tend to wear out faster than the rest of the holder.

It's these *replaceable jaws* that will make these Jackson Double-A models your preference for long, economical performance.

Standard Models Continued

Long-time favorites, Jackson insulated copper alloy holders with *one-piece tongs*, will, of course, be continued. They are of the same capacity as the double-A holders of like numbers, above.

Cables may be soldered, brazed, or clamped in place mechanically.

Model A-1	Model A-3	Model A-3S
$5.50	$7.00	$7.50

All prices lower in quantity.

Call your Jackson distributor for prompt delivery of these and many other Jackson Electrode Holders, Ground Clamps and Cable Fittings, Eyeshields, Safety Goggles.

JACKSON
PRODUCTS
WARREN · MICHIGAN

WORLD'S LARGEST MANUFACTURER OF ELECTRODE HOLDERS

Attention,
...weldors of lighter weight metals——

'HELIARC' by Hobart ...welds smoother, easier, faster!

It's no longer a problem to weld sheet metal, or metal such as aluminum, brass, stainless steel, magnesium alloys, high carbon, and other alloy steels. The new Hobart A. C. Transformer Type Welder, with modern "Heliarc" Equipment using helium or argon for inert gas-shielded welding, is the final answer. Here's why! It possesses extra strong high frequency stabilization which maintains a stable arc under the most adverse conditions. It minimizes rectification of the welding current in the arc. It insures good clean welding metal, and it strikes the arc without touching the electrode to the work. Available in 3 models for foot pedal control, automatic touch starting control, and Heliarc spot welds—all Hobart "Heliarc" Welders can be used without the Heliarc attachment by merely throwing a switch.

Less starting and stopping, improved weld quality, more welding per day, big savings in time and material, smooth and sound welds, with practically no spatter—all these advantages can be had from a welder with no moving parts, not even a fan. Dual Control, Remote Control, and 500 possible welding settings give added convenience and versatility.

Yes, the new Hobart A.C. "Heliarc" welder is a remarkable unit, capable of doing some amazing things. It will pay you to send for complete details and learn how well it fits into your welding needs. Write today to **HOBART BROTHERS COMPANY, Box U-100, Troy, Ohio**

HOBART Simplified Art WELDERS

"one of the world's largest builders of ***arc welders****"*

HOBART No. 13 ELECTRODE for sheet metal applications

An A.W.S. E-6013 electrode designed especially for sheet metal application where low penetration and fast working characteristics are advantageous. Can be used in all positions for A.C. and D.C. welding. It's one of the outstanding electrodes in the full range of types and sizes made by Hobart.

☐ A.C. Transformer "Heliarc" ☐ Bantam Champ D.C. Welder ☐ Portable D.C. Shop Welder ☐ Generator only "Build Your Own" ☐ Gas Drive D.C. Welder ☐ D.C. Welder A.C. Power ☐ A.C. Welder A.C. Power

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Please send information on HOBART Arc Welders of the type checked. Also text book checked.

Our work is_____

NAME_____ POSITION_____

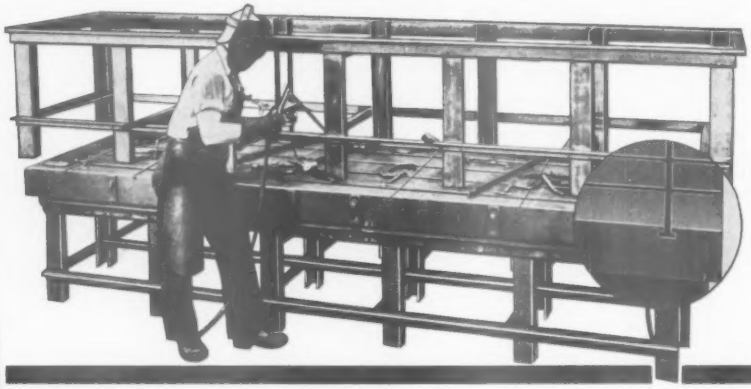
FIRM_____

ADDRESS_____

☐ Electric Arc Welding - Procedure & Practice. New text book—544 pages, profuse illus.
Price **$3.00**

NEW! CHALLENGE *Semi-Steel* WELDING TABLE

with arc-welded all-steel stand

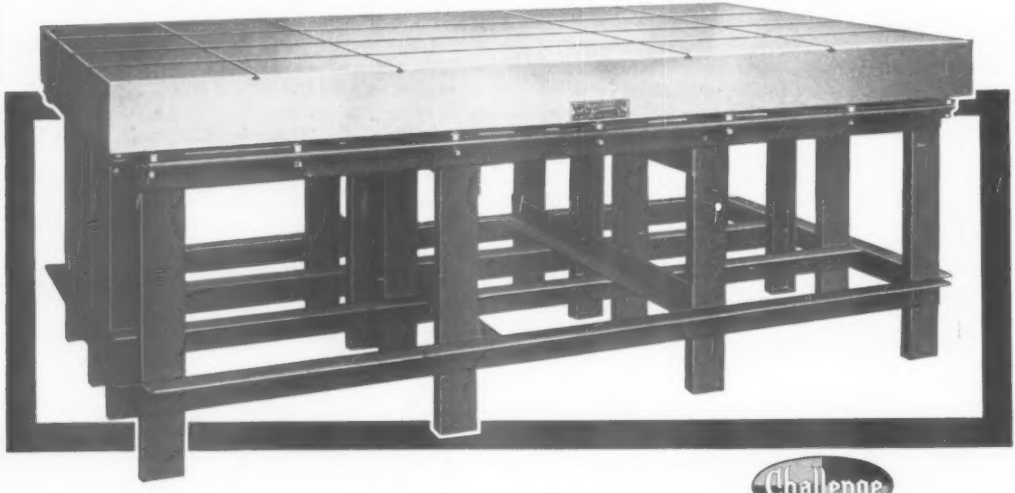


TEE-SLOT CONSTRUCTION

The Challenge Semi-Steel Welding Table provides a true, rigid surface with Tee-Slots to facilitate assembling, locating and welding. It is built of fine grain special analysis semi-steel—perfectly smooth and square. Made in three standard sizes, 30x60", 48x96" and 54x144"; other sizes to order.

On special order, plates will be grooved and keyed so that two or more plates can be assembled and mounted into one complete unit. For example, four 54x144" plates into one huge unit 144x216".

ALL-STEEL STAND INCLUDED. The Challenge Semi-Steel Welding Table is sold with a sturdy arc-welded, all-steel stand which makes a substantial base that has the strength and solidity of a one-piece unit. The stand is equipped with lock leveling screws, enabling the user to level his plate quickly and lock it securely. The number of lock leveling screws varies from 19 on the 30x60-inch size to 59 on the 54x144-inch size.



Challenge

THE CHALLENGE MACHINERY COMPANY

GRAND HAVEN, MICHIGAN

F. 1751

THE WELDING ENGINEER

THE WELDING ENGINEER, *with which is combined The Acetylene Journal*

A McGRAW-HILL PUBLICATION

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Clyde B. Clason, *Managing Editor*

William C. Henzlik, *Assistant Editor*

Jack I. Medoff, *Eastern Editor*

George B. Bryant, Jr., *Chief Washington Bureau*

Russell F. Anderson, *Editor World News*

C. H. Clarke
Eastern Manager, New York, Tel. LOngacre 4-3000

E. J. McOsker
Central Manager, Hanna Bldg., Cleveland Tel. Superior 7000

Thomas H. Barry
Western Manager, Chicago, Tel. WHitehall 4-7900

Carl W. Dysinger
1111 Wilshire Boulevard, Los Angeles, Calif. Tel. MAdison 6-4323

John W. Otterson
68 Post Street, San Francisco, Calif. Tel. Douglas 2-4600

J. H. Allen, Jr.
First National Bank Bldg., Dallas, Tex. Tel. Prospect 7-5064

John Doyle
Assistant to Manager

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OCTOBER, 1950

COVER: *For the photos that make up this composite picture of welding in industry, we are indebted to the Ford Motor Co., Westinghouse Electric Corp., The Stoody Co., General Electric Co. and Pullman-Standard Car Mfg. Co.*

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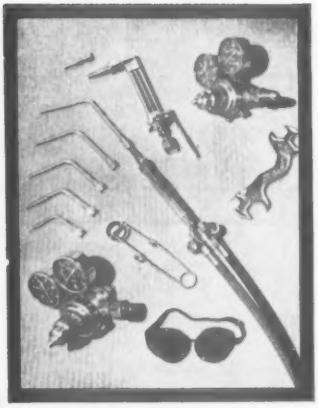


for over forty years the leading line on the pacific coast

. . . now expanding nationally

here is an unusual opportunity for aggressive distributors in the welding equipment business . . .

Rarely does a manufacturer of a proved and long established line of high quality gas welding and flame-cutting apparatus open up new territories . . .

but . . . here is an opportunity.

For over forty years, our company has been active on the Pacific Coast, both as large contractors and as manufacturers of gas welding apparatus.

we are the oldest in the welding industry on the pacific coast

The outstanding quality of our products has brought us several of the finest and best known distributing organizations of the country . . .

We are seeking to open up a few more territories.

If this invitation interests you, write us today and please give full particulars of your operations and the extent of your effective selling area. We, in turn, will offer you the fullest opportunity to verify our claims and to test our products.

Here are some of the advantages we believe our company and our products offer you and your customers:

1. A line of equipment which is unmatched in uniformly high quality and dependable performance.
2. A line of equipment which stays out of the repair shop and on the job.
3. A clean-cut policy which makes the relationship between distributor and manufacturer a mutual pleasure.
4. Fair prices and just discounts.
5. An ironclad determination to stand behind the product and the distributor in the only tangible way—PERFORMANCE.
6. And, finally, for your customers, a greater number of improvements, of outstanding developments, than either they or you have ever encountered in any fine line of welding and cutting equipment.

write to:

George L. Hammon, *Vice President*
National Welding Equipment Co.
218 Fremont Street
San Francisco 5, California

Made by National WELDING EQUIPMENT CO., San Francisco 5, California

Simply clean surface with **dy✓chek** Cleaner

STEP 1

Simply apply **dy✓chek** Dye Penetrant *(by brush, spray, or dip)*

STEP 2

Simplified Non-Destructive Testing

Simply remove excess dye with **dy✓chek** Cleaner

STEP 3

Simply apply **dy✓chek** Developer

STEP 4

RAPID ACCURATE INSPECTION

Any Metal – Anywhere

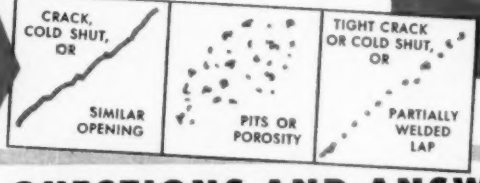
4 SIMPLE STEPS

by

dy✓chek TRADE-MARK

the dye penetrant inspection method

AND... FLAWS ARE REVEALED



QUESTIONS AND ANSWERS

Q. What is Dy-Chek?

A. Dy-Chek is the revolutionary new dye penetrant method of inspection developed by *Northrop Aircraft Research.* It consists of three special liquid compounds easily applied by brush, spray, or dip.

Q. What does it do?

A. Dy-Chek reveals the location, extent, and nature of any flaw having a surface opening or discontinuity in any metal.

Q. Will Dy-Chek work on non-magnetic metals?

A. Yes, it works on *any* metal.

Q. Are special lights required?

A. No lights, booths, electricity, or special installations are necessary.

Q. What kind of metal surface can Dy-Chek inspect?

A. Any kind, including castings, forgings, machined parts, plate, sheet, tubing, pipe, and weldments.

Q. Must the surface to be inspected be specially prepared?

A. The surface need only be clean of dirt, grease, scale, etc. The surface need not be smooth.

Q. Can Dy-Chek be used in the field, for preventive maintenance, as well as in a plant for manufacturing and receiving inspection?

A. Yes, the complete portability of Dy-Chek is one of its great advantages.

LEARN HOW the Dy-Chek method of non-destructive testing can save you time and money in your business. Ask for complete details today.

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dy✓chek — *the dye penetrant inspection method*

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Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Acclaimed by industry

TORCHWELD "6500"®

"We now get two-stage regulator performance . . . at single-stage regulator cost . . ."
"Delivers pressures that do not vary as the cylinder empties . . ."
"Most accurate regulator I have ever used regardless of price . . ."
"Gives steady gas-flow for hour-after-hour welding . . ."
"Plenty of volume for heavy-duty cutting right down to the end of the cylinder . . ."
"One setting is enough to do any job . . . and readjustments are never necessary . . ."
"Not just good performance . . . but rugged construction and easy maintenance, too . . ."
TORCHWELD

Here's why Torchweld "6500" delivers constant pressure and volume regardless of cylinder pressure

In any regulator the pressure of the incoming gas is one of the forces operating the valve mechanism. As cylinder pressure drops, this force decreases, causing a variation in the volume of gas flowing through the valve.

In the TORCHWELD "6500", a pressure compensating chamber below the seat counteracts the effect of this decreasing force.

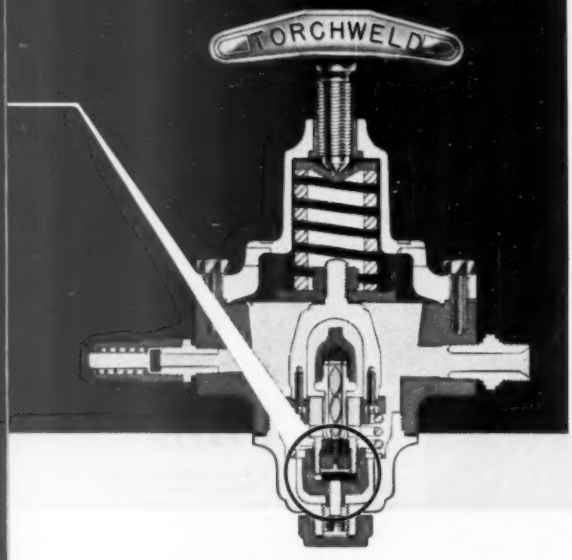
A small passage in the valve seat permits gas at *cylinder pressure* to enter the chamber. At the bottom of the chamber is a reinforced rubber sealing disk. Below the disk is a pin which rests against the back of the regulator.

The forces within the chamber act upon the disk and pin so that there is a resultant effective force which tends to move the seat upward toward the nozzle.

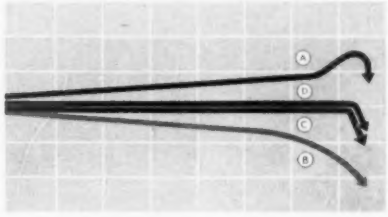
As cylinder pressure drops this upward force diminishes, resulting in a gradual increase of the spacing between seat and nozzle. This compensates for the effects of decreasing cylinder pressures, and thus maintains constant delivery pressure and volume.

as truly revolutionary!

REGULATOR with pressure compensating chamber



Here's how various types of regulators act as cylinder pressure drops



Ⓐ *Stem-type* single-stage regulator delivers at *increasingly higher* pressures as the cylinder empties. Frequent pressure adjustments are necessary.

Ⓑ *Nozzle-type* single-stage regulator delivers gas at pressures that *drop lower and lower* as the cylinder empties. Frequent pressure adjustments are necessary.

Ⓒ *Two-Stage* regulator gives uniform working pressure regardless of cylinder pressure, depending upon quality of regulator. Pressure adjustments are avoided.

Ⓓ TORCHWELD "6500" REGULATOR delivers constant working pressure (whatever it's set for) regardless of drop in cylinder pressure. No adjustments are necessary to maintain desired flame characteristics.

Plants and welding shops everywhere are buying the TORCHWELD "6500" to get the best performance at the least cost

It costs only slightly more than the average single-stage regulator, but it gives the precise control heretofore available only in higher-priced two-stage regulators. That's the reason the TORCHWELD "6500" is the wise choice wherever regulators must be replaced, or new equipment ordered.

Acclaimed the first major advance in regulator design in 20 years, the TORCHWELD "6500" is a brand new *type* of regulator, combining the advantages of both single and two-stage regulation without the disadvantages of either.

The TORCHWELD "6500" delivers precise and constant working pressure (at whatever setting you choose) *regardless of decreasing cylinder pressure.* This is made possible, at a price to please every pocketbook, by the unique NCG-engineered *"pressure compensating chamber"*—an exclusive feature.

What's more—the "6500" has all the quality refinements characteristic of TORCHWELD—extra-big streamlined gas passages, exclusive "SPIREX" nozzle element that prevents seat ignition, inlet filter, relief valve, rugged construction and few working parts to wear or repair. Better write *today* for Bulletin No. NTW-104 and get *all* the details.

NATIONAL CYLINDER GAS COMPANY

Executive Offices: 856 N. Michigan Avenue, Chicago 11, Illinois

Copr. 1950, National Cylinder Gas Co.

NCG®

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Please send me a copy of Bulletin NTW-104 containing full particulars on the sensational new TORCHWELD "6500" regulator.

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COMPANY_____

STREET ADDRESS_____

CITY_____ ZONE____ STATE_____

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AO's New Metal Ful-Vue Safety GOGGLE!

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With the introduction of the F4100 Metal Ful-Vue, AO's protection against the impact of flying particles reaches its highest development. Here in one goggle, with or without side shields, workers can obtain the peace of mind which comes from assured safety . . . the utmost in comfort over nose and temples . . . the very finest in EYE APPEAL PLUS EYE PROTECTION!

QUICK FACTS

NEW EYEWIRE — A major contribution to *looks with strength.* Outer edges are square instead of round with a deep groove to hold lenses securely in place. Beaded engraving adds a distinctive touch. The lightweight eyewire is strong and durable.

NEW RUGGED ENDPIECE—Streamlined . . . with a wide bearing surface at hinge which minimizes temple drop. Screw heads are countersunk and flush with endpieces for added good looks, non-sagging security.

NEW LIGHTWEIGHT TEMPLE—Oval temples instead of round for greater comfort and attractiveness. Easily adjusted, perspiration proof. Insulated semi or half tubing is another appearance improver and will outlast life of the temple. Tubing will not come off and it can't be discolored by dirt or grease. Both the temple and endpiece screws are AO patented "Ever-tite" construction . . . they keep tight in service yet remove quickly when replacing lenses.

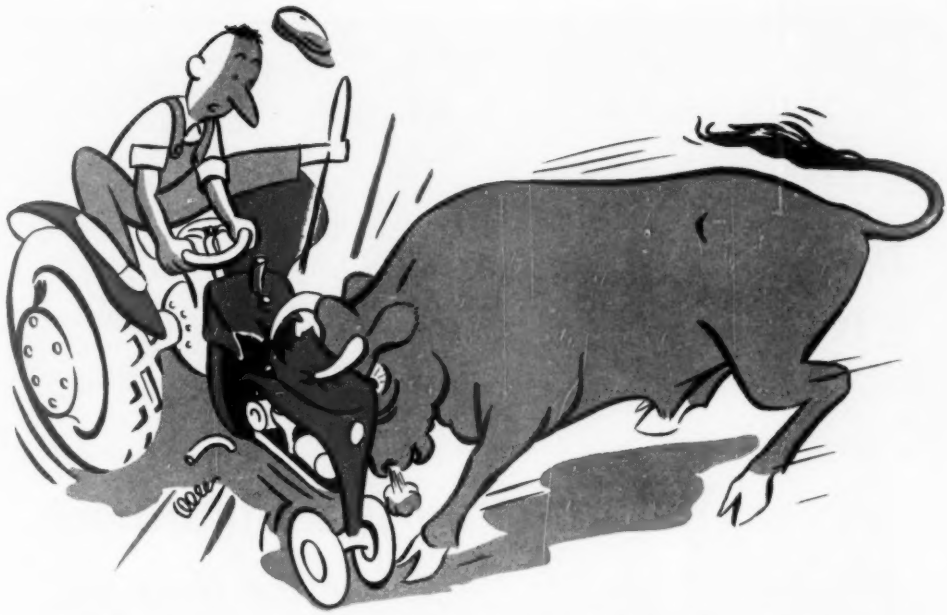
IMPROVED GUARD ARMS AND BRIDGE — Guard Arms are newly shaped — longer with more opening for added ease of adjustment. The bridge is double braced with four contact joints — a feature found only in AO Ful-Vue spectacle goggles.

NEW SIDE SHIELD CONSTRUCTION — A real time saver . . . new one-piece binder and eyewire construction *eliminates necessity of inserting the screen before inserting lenses!* Replacement of lenses can now be made without any interference with or from the side shield.

For these and many other reasons, be sure to see the new F4100, YOUR NEAREST AO SAFETY REPRESENTATIVE CAN SUPPLY YOU.

American Optical COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES



HAVE YOU A FRACTURE PROBLEM? DON'T WORRY—

WELD IT IN A HURRY WITH REVERE #456 BRONZE WELDING ROD

THE "FLAME-TESTED" ROD IN THE DISTINCTIVE RED, WHITE AND BLUE PACKAGE

From the smallest fracture to the largest, here's how you can save 3 ways by using Revere #456 Low Fuming Bronze Welding Rod:

1 **FASTER PREPARATION**—Time is saved in preparing the parts to be joined as the high strength of Revere #456 permits wide assembly tolerances, yet provides strong, neatly-finished joints.

2 **NO HIGH PRE-HEATS AND POST-HEATS**—You save on the time and fuel costs involved in pre-heating because the low melting point of Revere #456 (about 1600° F.) reduces the need for high pre-heats and post-heats.

3 **LESS "CLEAN-UP"**—Because it is low fuming Revere #456 enables you to get more accurate placement of the weld metal and thus saves on "clean-up" costs.

Next time you have a fracture problem in cast or malleable irons, wrought iron, cast or wrought steel, cast or wrought bronze, try Revere #456. Once you've worked with this "flame-tested" rod you'll see how it cuts costs, saves time and gives better results. Make Revere #456 prove itself. Order a package today.

Other Revere Welding Rods are: Revere Bronze 380, Manganese Bronze, Herculoy, Phosphor Bronzes, Brass (Brazing Rod) Silicon Deoxidized Copper and Electrolytic Copper. All come in 100-pound cases or in 25-pound cartons, net weight, and are stocked by Revere Welding Rod Distributors in all parts of the country. Write for folder giving technical data.

REVERE

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Founded by Paul Revere in 1801

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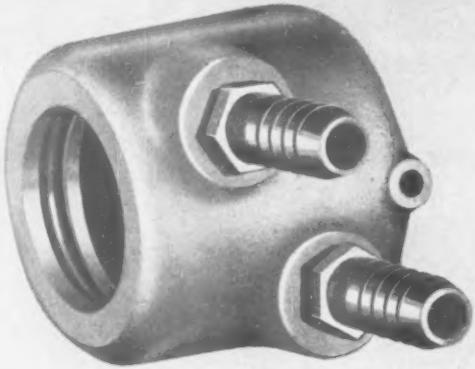
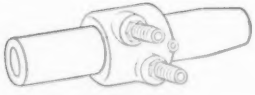
Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.
Sales Offices in Principal Cities, Distributors Everywhere.

Value Beyond The Purchase



Mallory Cooling Chambers



Special Features of

MALLORY EXTERNAL COOLING CHAMBERS

One-Piece Aluminum Casting

Rubber "O" Ring Seals

Standard Water Nipples

Allen-Head Set-Screw Lock-On

Two Diameters—

⅝", K503509

1¼", K503512

Help take the Heat Off Hard-to-Cool Welding Applications

Many resistance welding applications require extra water cooling of the electrodes in order to obtain long service life at high production rates. Others . . . such as those involving projection welding studs and bolts . . . make it impossible to bring the cooling water in the electrode or die close enough to the welding face to insure satisfactory production.

Mallory offers two external cooling chambers . . . for ⅝" and 1¼" electrodes or dies . . . to supply an independent source of cooling water. Rubber "O" ring seals and standard nipples assure tight connections and facilitate easy set-up.

These standard Mallory chambers are recommended especially for application to internally-cooled electrodes and dies which operate at excessive temperatures. The added cooling capacity lessens down time and lengthens the life of equipment.

That's value beyond the purchase!

Mallory's resistance welding know-how is at your disposal. What Mallory has done for others, can be done for you!

In Canada, made and sold by Johnson, Matthey and Mallory, Limited 130 Industry Street, Toronto 15, Ontario

Resistance Welding Electrodes, Holders, Dies, Rod and Bars, Castings, Forgings

SERVING INDUSTRY WITH

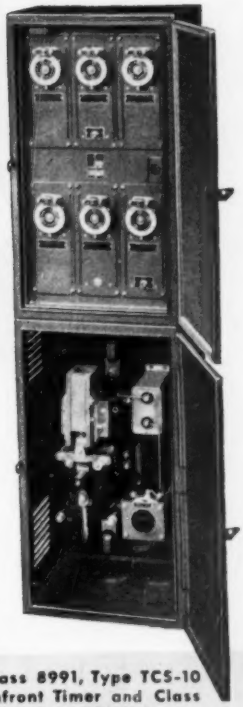
Capacitors — Contacts
Controls — Resistors
Rectifiers — Vibrators
Special Switches — Power Supplies
Resistance Welding Materials

P. R. MALLORY & CO. Inc.

MALLORY

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

Specify.. SQUARE D Safront RESISTANCE WELDER CONTROL



Class 8991, Type TCS-10 Safront Timer and Class 8990, Type SCG-2 Syncro-Break Contactor arranged for wall mounting. The same size, neat appearing enclosure is used for 4 and 6 period Safront timers and sizes 1W and 2W Syncro-Break contactors.

FOR CONTINUOUS PRODUCTION—heavy duty rugged construction, hardened moving parts, and accurate, dependable pneumatic timer units.

FOR OPERATOR SAFETY—Safront panel construction isolates individual timer adjustments from live parts. Transformer provides 110 volts for all control circuits.

FOR MOUNTING FLEXIBILITY—Dimensions are standardized. Timers and contactors can be mounted in four different positions for wall or machine mounting.

FOR LOW INSTALLATION COST—Matching knockouts permit close coupling of enclosures, eliminating need for conduit run between contactor and timer.

FOR SIMPLIFIED MAINTENANCE—Accessible mechanical parts and easy coil replacement reduce "down" time and maintenance costs.

When extreme precision or speed is required—use Square D's Electronic Welder Control. Write for Bulletins 8990-8993 which detail the complete Square D line, magnetic and electronic. Address Square D Company, 4041 N. Richards Street, Milwaukee 12, Wisconsin.

SQUARE D COMPANY

DETROIT · MILWAUKEE · LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

Flanged-and-Dished HEADS *for Every Need*

BETHLEHEM STEEL

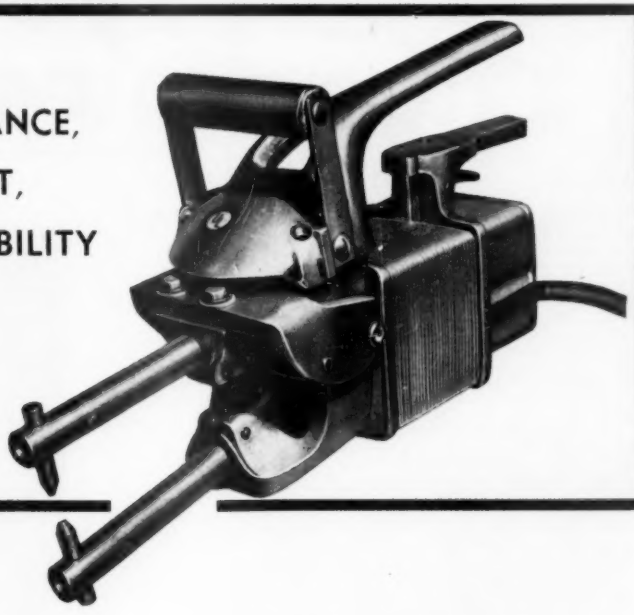
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

For those "Hard to get at" Jobs...
USE A GASTON PORTABLE SPOT WELDER!

HIGH PERFORMANCE,
LIGHT WEIGHT,
UNUSUAL PORTABILITY

Model No. 230
Net Wt. 23¼ lbs.



For complete flexibility, speed and low cost in handling remotely located welding jobs, there's nothing like a Gaston Portable! Its high performance, light weight and compact size make it a natural for all shop work, and the welding of equipment breakdowns that must be made at the installation site.

Welds mild or stainless steel up to ⅛" combined thickness. Has vise-like grip exerted by ingenious compound leverage—holds work in exact position before current is applied. Just pull trigger switch and weld is made.

Completely self-contained unit weighs only 23¼ lbs. Wide use of light weight, high-tensile aluminum castings and efficient silicon steel makes this Gaston welder outstanding in performance. No heavy, bulky current conducting cables as found on two-unit welders. Welding tips are connected directly to power transformer through heavy copper arms.

Model No. 230 shown above, operates on 220-240 volt, 50/60 cycle, single phase and draws current only when trigger is pulled. Equipped with 6" standard type arms, tips, and 10 ft. flexible 3-conductor power cable, less plug.

Write today for Free Bulletin and
Prices on Welder and Accessories.

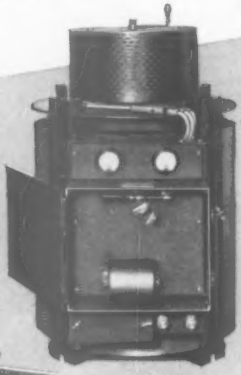
Manufacturers' Representatives and Jobbers: A Few Good Territories Still Available

KARMA MANUFACTURING CO.
14823 LOOMIS STREET • HARVEY, ILLINOIS

A pioneer in the development of a-c welding since 1919, G.E. is constantly improving the performance of its welders . . . and has **STEADILY REDUCED PRICES!**

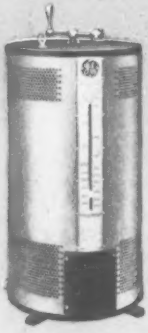
New FOR LESS

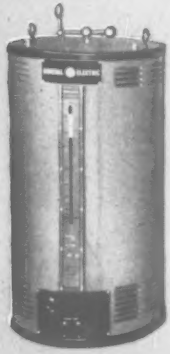
1934
With the development of coated electrodes, the use of a-c welders commercially became a reality. This 1934 500-amp model weighed about 1200 pounds and was sold for $825.



1937
This a-c welder, also 500-amps, tipped the scales at 900 pounds. It was sold for $675.

1940
With this 500-amp welder, weight was cut to 600 pounds and it was sold for $550.





1949
By 1949 the 500-amp welder was streamlined and was sold for $495.

40"

1940 **This standard 300-amp a-c welder, though not big for its day, was unwieldy and cumbersome compared to today's compact models. It weighed 600 pounds and sold for $410.**

1950 G-E welders give you—

1. *Automatic "Hot-Start" Control*—easy arc-striking with *no* manual adjustment necessary.
2. *Arc-Stabilizing Capacitors*—assure a steady arc with no pop-outs.
3. *G-E Silicone Insulation*—Use of *SILICONE* insulation results in a lightweight, space-saving welder. Since this insulation is water-repellent and resistant to high temperatures, it offers maximum protection for both operator and welder.
4. *Stepless Current Control*—gives you precise current settings over the entire wide range.
5. *Built-in Capacitors*—reduce input current and improve power factor, reducing installation and power costs.
6. *Fan-forced Ventilation* (in 400-amp ratings and larger)—maintains cool, safe operating temperatures.

You can put your confidence in . . .

A-C Welders

THAN 1940 PRICES

35"

Today's G-E Welders give you 6 Major Improvements for Less Money

1950 Including many new features, which mean superior performance, this latest Type WK-30 welder weighs just 328 pounds and is sold for $365*—a reduction of 272 pounds and $45.

Yes, General Electric welder design, performance, and appearance have been continually improved. With all of these improvements at less than pre-war prices, you just can't lose with a 1950 General Electric welder. Consult your nearest G-E Welding Distributor to determine the type and rating of welder best suited to your requirements; he can give you immediate delivery on all standard models. If you don't know him, write us for his name and address: *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

*Prices are manufacturer's suggested retail price in Zone 1. Slightly higher in other zones.

200-AMP WELDERS, TOO . . .

Weighs only 154 lbs.

Less than two feet high, this welder includes all of the money-saving features of the standard G-E 300-amp a-c welder. With a current range from 30 to 250-amps and NEMA rated at 50% duty cycle, it can weld many a job without having to tie up large units.

ARC-WELDERS • ELECTRODES • ACCESSORIES • RENEWAL PARTS

GENERAL ELECTRIC

711-13

NEW Aircomatic® Process jumps Welding Speeds to NEW HIGHS

Aircomatic is a new metal arc welding process that permits high-speed welding of aluminum, of aluminum bronze and of stainless steel – *in all positions*..

The process uses a bare wire electrode in coil form, continuously fed to the work within an inert gas shield. High current densities are used providing excellent penetration and high deposition rates, *permitting welding at speeds greater than ever before possible.*

Aircomatic welding has proved most economical . . . for its high deposition rate, in addition to permitting high travel speed, also makes possible fewer passes on heavy material, and faster, heavier deposits for overlay or build-up work. This means more weld per unit of arc time, whatever the job. Further, since the wire is bare and continuously fed through a shield of inert gas, electrode changes and slag removal interruptions are eliminated, thus permitting almost 100% arc time in using the high operating speeds.

SAVES 16 MAN-HOURS WELDING TIME. . . Dempster Brothers, Incorporated of Knoxville, Tenn., makers of the nationally-known "Dempster-Dumpster" found Aircomatic welding cut their aluminum container manufacturing costs.

The other method was slow – cumbersome, and ran the cost exceedingly high. With Aircomatic the same container was produced – at a welding cost reduction of approximately 16 man-hours.

Another important feature of Aircomatic welding is its minimization of distortion. This is due to its high speed operation (heat can be concentrated and moved rapidly along the work), plus the fact that a small amount of weld metal is all that's required in most joints.

The case studies on the opposite page show how this dramatic new welding process is helping others. While the facts and figures are startling, they could very easily be applied in your own shop . . . but find out for sure. Write . . . or phone your nearby Airco office. Ask for a copy of ADR 66: "Aircomatic Welding Process".

SAVES 4½ HOURS . . Martin-Quaid Co., of Philadelphia, Pa., used the New Aircomatic Process to reduce the time and cost of welding huge stainless steel cylinders used in the manufacture of carpets. They found this revolutionary process cut materials cost 25% . . . and saved 4½ hours working time over the old method – and, at the same time, greatly increased the quality of the finished product.

REDUCES TIME 4/5's . . . Consolidated Welding and Engineering Company, of Chicago, Ill., adopted the new Aircomatic process for welding aluminum separators. Immediately, major production and cost problems were solved: To weld one complete separator assembly took only 90 man hours – about 1/5 the time of other methods.

Further, Aircomatic's high current density and the attendant high welding speed confined the heating effects to the narrow weld-zone . . . completely eliminating distortion.

ELIMINATES LEAKS . . Griffin & Company, of Louisville, Ky., found Aircomatic's high speed and the ability to make welds without interruption ideally suited to the fabrication of tanks for all-aluminum evaporative coolers. Production time and cost was cut to the minimum, and warpage and distortion were completely eliminated. Thus far, the company has made hundreds of these tanks without a single leak.

BOOSTS PRODUCTION 71% . . . The Stewart-Warner Corporation, South Wind Division, Indianapolis, Ind., join the upper and lower halves of its "Safe-Air Gas Home Heater" with the completely new, high-speed Aircomatic Process. This time-saving, cost-cutting process skyrocketed production 71% . . . and cut manufacturing costs in proportion.

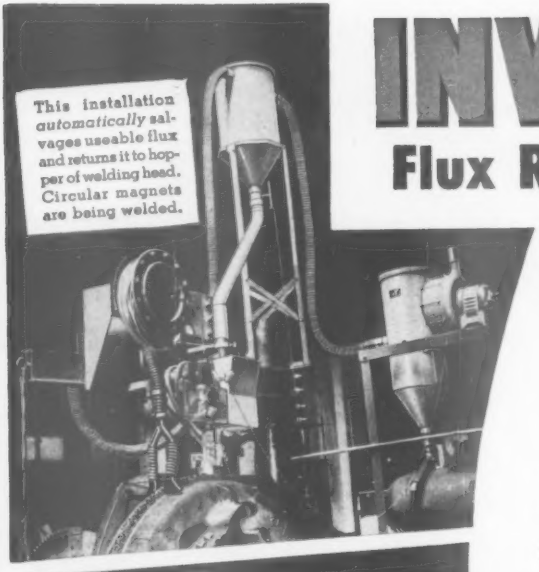
See Aircomatic in Operation at our Booth—No. 422 • Chicago National Metal Show October 23-27, 1950.

AIRCO AIR REDUCTION

Offices in Principal Cities

HEADQUARTERS FOR OXYGEN, ACETYLENE AND OTHER GASES . . . CALCIUM CARBIDE . . . GAS CUTTING MACHINES . . . GAS WELDING AND CUTTING APPARATUS, AND SUPPLIES . . . ARC WELDERS, ELECTRODES AND ACCESSORIES

INVINCIBLE
Flux Recovery Systems



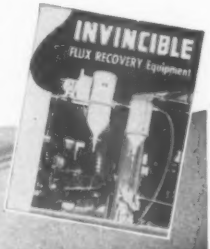
This installation *automatically* salvages useable flux and returns it to hopper of welding head. Circular magnets are being welded.

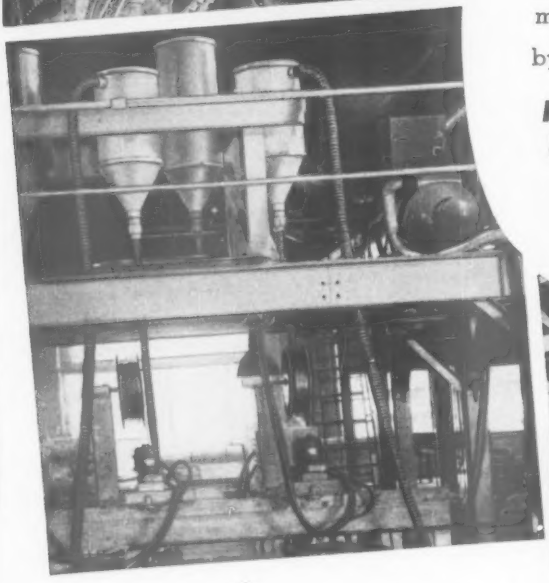
Quickly Repay Their Costs

• On submerged arc welding jobs, Invincible Flux Recovery Units save money by: **1** Salvaging *all* unfused flux, **2** Operating far more efficiently than manual methods, **3** Reducing welding rejects by removing all fine dust (flux flour).

FREE FOLDER on FLUX RECOVERY

Describes and illustrates the complete Invincible line . . . *send for your copy Now!*





Flux is being recovered simultaneously from *2* welding heads on this installation. Water tanks are being welded.

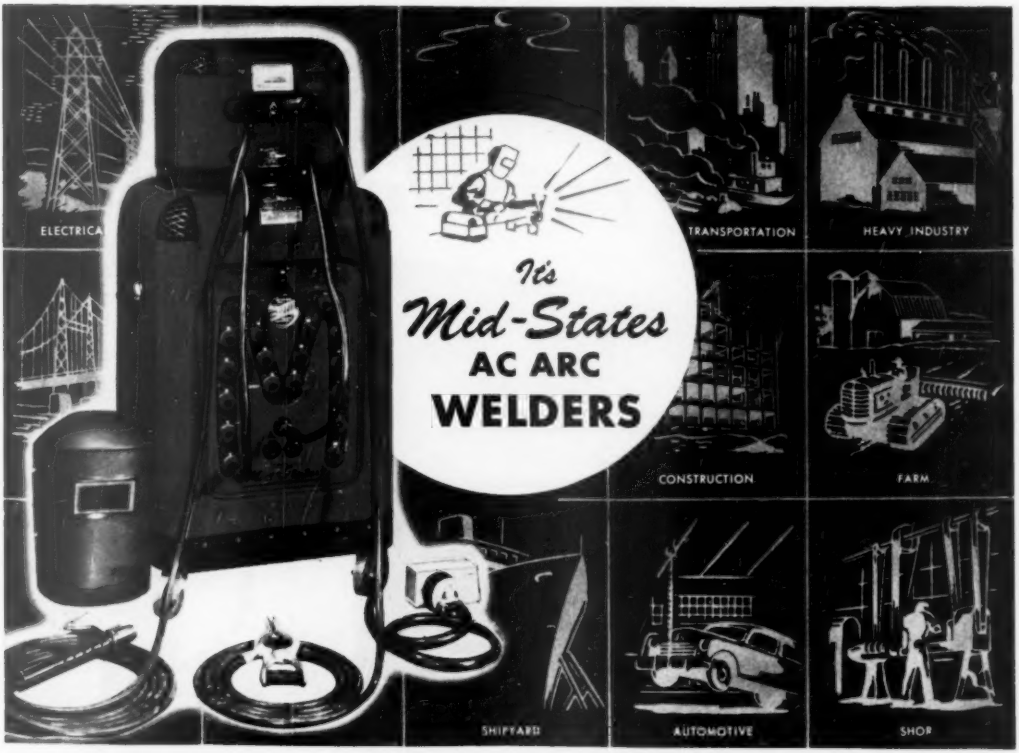
Welding locomotive parts. *Only* primary separator tank is elevated, thus eliminating need for another supporting jig.

INVINCIBLE VACUUM CLEANER MFG. CO.

DOVER, OHIO

FOR 40 YEARS, LEADERS IN INDUSTRIAL VACUUM EQUIPMENT

FOR LOWEST COST plus HIGHEST QUALITY WELDING



EFFICIENCY — VERSATILITY — ECONOMY

MID-STATES, the trademark of welder quality and efficiency. The many thousands in use the world over, giving years of trouble-free service, attest to their superior engineering design and rugged construction.

Among the outstanding features of MID-STATES welders are: one-second heat changes — noiseless — no moving parts — no creeping, which insures unvarying amperage output . . . transformer carries 5-year burnout-proof guarantee.

A MID-STATES quickly pays for itself through lower operating costs and increased efficiency. There is a model for every welding need — from light gauge metal to heavy plate, ferrous or non-ferrous.

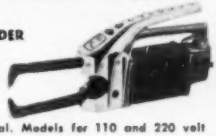
Get the facts!

SEND TODAY FOR DETAILS AND DESCRIPTIVE LITERATURE

HIGH FREQUENCY ARC STABILIZER

The MISSING LINK starts arc automatically—no pecking or scratching. Makes possible the use of any welding rod, coated or bare, reverse polarity, aluminum, bronze, stainless steel — in fact, any welding rod, AC or DC. Models for Metal Arc and Inert Gas Shielded welding processes.

ZIP PORTABLE SPOT WELDER



The acme of spot welder perfection. Exclusive patented features make possible scores of new spot welding applications. Perfectly balanced, fully portable, welds to 1/8" thickness of metal. Models for 110 and 220 volt operation.

9000 CARBON ARC TORCH

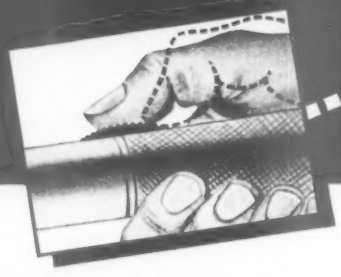
An indispensible accessory to every welding shop—for WELDING, BRAZING, SOLDERING, HARD SURFACING and PRE-HEATING. Pure intense electronic heat, no pressure blowing, no burn-through on thin metals.

Mid-States WELDER MFG. CO.

6025 SOUTH ASHLAND AVENUE · CHICAGO 36, ILLINOIS

Every Time you use the button...

1. You save money by preventing the waste of Oxygen and Acetylene that occurs every second a torch flame burns yet is not actually applied to work.
2. You save time by eliminating constant lighting, flame adjusting and Torch shut off. This adds materially to output of work.
3. You make life easier for the torch operator. A single quarter-inch movement of the thumb accomplishes the same result as a dozen or more motions, involving both hands.
4. You bring your operations up-to-date by as big an improvement as that made when self starters were added to automobiles — more so, in fact, since the Harris Automatic Torch repays its entire cost many times over in cash savings.
5. When you next see a torch burning, without being applied to work, decide to DO something about it! Contact the nearest Harris Exclusive Distributor, located in principal Cities. Better yet, do it now.



THE HARRIS CALORIFIC COMPANY

Cleveland 2, Ohio

HARRIS

SERVING THE METAL INDUSTRY SINCE 1905

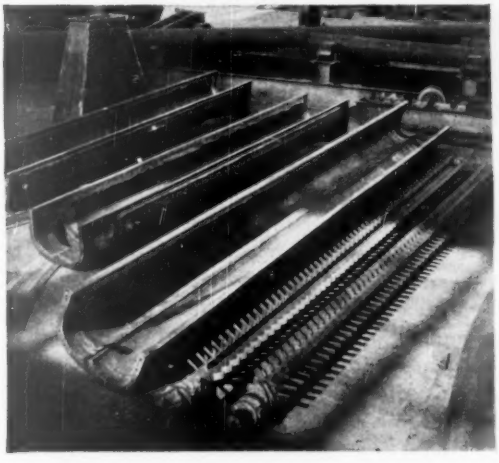
good reasons

to build it of **EVERDUR**

to weld it with **EVERDUR**

Fabricating this welded water-jacketed conveyor-mixer was a tricky job . . . and Everdur* is part of the trick. The material used was mostly Everdur Copper-Silicon Alloys—in the form of sheet, rod, tube, pipe and bar. That's because the job called for a tough, high-strength, non-rust material that would dependably resist corrosion and erosion . . . and that could be readily fusion-welded with a rod of similar characteristics.

Joining those hundreds of Everdur fins to Everdur tubes to form the propeller units in perfect alignment was a tricky job of inert-gas-shielded-arc welding with Everdur rod.



Whether it's a matter of production-brazing, or a complicated repair in a fractured casting, you can usually save time and money with ANACONDA Welding Rods. Our technical men know welding "forwards and backwards." Their advice is yours for the asking.

Write now for Publication B-13, "ANACONDA Welding Rods and Procedures."

ANACONDA Bronze Welding Rods are available from distributors throughout the United States. The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 50191

*Reg. U. S. Pat. Off.

You can depend on ANACONDA WELDING RODS

For FRUEHAUF Trailers... It's MUREX, too!

MUREX ELECTRODES

METAL & THERMIT CORPORATION
100 EAST 42nd STREET • NEW YORK 17, N. Y.

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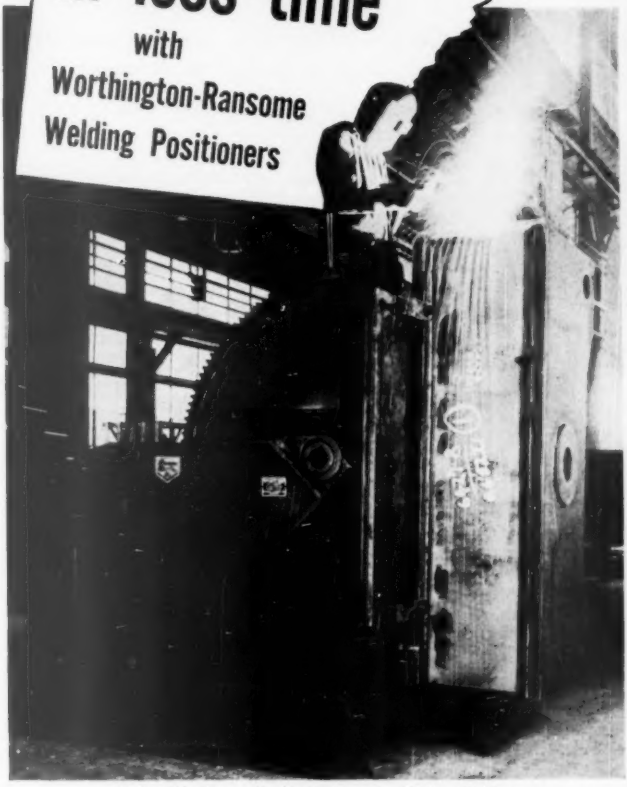
MUREX ELECTRODES and M & T a-c welders work together to provide economical welding in the production of Fruehauf trailers. High speed, specially designed Murex electrodes for joining light sections and sheet metal provide more feet of welding per hour. Efficient M & T a-c transformers reduce idling current to a minimum; assure lower power costs.

Prominent fabricators of every type of welded equipment, both heavy and light, rely on Murex for highest welding quality and welding economy. Let us show you what Murex can do. As a starter, write today for descriptive bulletins on electrodes, machines, accessories.

These Welders Produce more in less time with Worthington-Ransome Welding Positioners



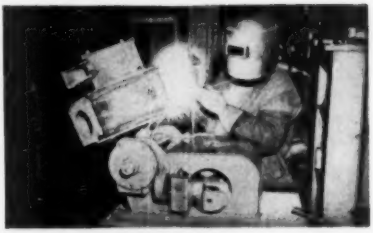
Model 240: 12-ton Worthington-Ransome Welding Positioner

One sure way to drive production costs down and meet competitive prices is to have a Worthington-Ransome positioner "handle" the work. Your welder can then get more *arc time* out of each working hour.

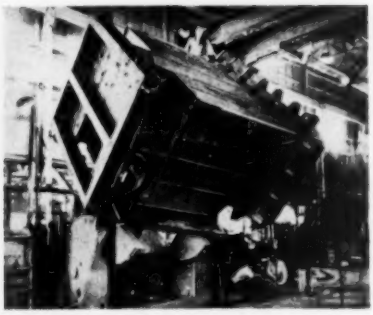
All welds, either manual or automatic, can be made in the economical "downhand" position, using heavier electrodes, for better, neater, quicker welds.

The full line of Worthington-Ransome positioning equipment includes Positioners with capacities from 100 lbs to 20 tons; and Turning Rolls with capacities from 3 tons to 75 tons, both stationary and self-propelled.

Model 5: 500 lb Worthington-Ransome Welding Positioner



Model 1P: 100 lb Worthington-Ransome Welding Positioner



Model 400: 20-ton Worthington-Ransome Welding Positioner

50% PRODUCTION UP
LABOR COSTS DOWN

Welding Positioners
Turning Rolls

WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORPORATION
Welding and Assembly Positioning Equipment Division
DUNELLEN, NEW JERSEY

Worthington Pump and Machinery Corp.
Dunellen, N. J.

Please send Bulletin 228 on Worthington-Ransome Turning Rolls.

NAME .....

COMPANY .....

ADDRESS .....

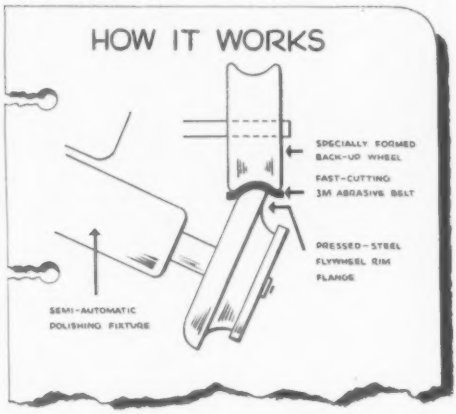
"Formed-wheel" belt grinding cuts 3-step job to one!

SEMI-AUTOMATIC polishing fixture spins and turns 20" pressed-steel wheel against fast-cutting belt. Savings with 3M Abrasives soon pay for equipment and automatic fixtures. Belt back-up wheel is specially formed to mate with curve of flywheel flange. Formed-wheel belt grinding can cut *your* grinding costs, too!

3M Abrasives slash grinding time 71% at American Type Founders

Time study figures prove it! Formed back-up wheels and 3M Abrasives are saving American Type Founders $1.15 on every "Little Giant" press flywheel they finish. A one-step operation now gives these wheels a smoother, cleaner surface in only 7¼ minutes instead of 25 minutes with the former 3-step method.

Diagram below shows how formed back-up wheel matches the contour of the flywheel rim, gives uniform results, saves 71% on time alone.



You can make savings in time and money on *your* heavy grinding and finishing by consulting one of our experienced Methods Engineers. Just write Dept. WE-105 for this service offered at no cost, no obligation.

WE INVITE YOU TO USE OUR DEMONSTRATION ROOMS . . . work out faster, more economical grinding and finishing methods. A 3M Methods Engineer will grind your sample parts on modern belt grinding equipment, show you how to cut costs. For nearest location, address Dept. WE-105.

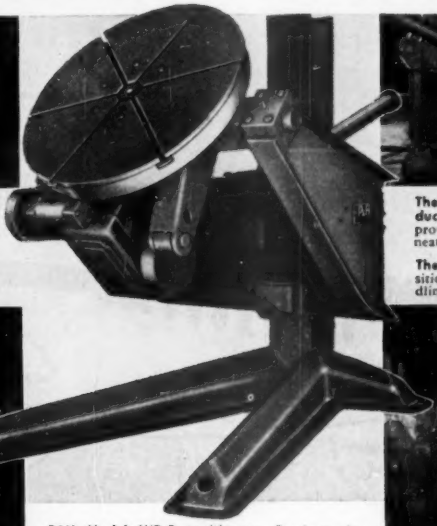
Made in U.S.A. by MINNESOTA MINING & MFG. CO., St. Paul 6, Minn., also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-Slip Surfacing, "3M" Adhesives.
General Export: Durex Abrasives Corp., New Rochelle, N. Y.
In Canada: Canadian Durex Abrasives Ltd., Brantford, Canada.

P&H Positioners

save time, improve welds and cut costs up to 50%

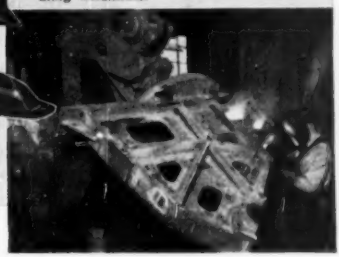
They reduce welding costs — operator welds downhand, uses a "hotter," larger rod, and deposits more metal.

They save valuable handling time — the positioner does everything. No extra men, hoists, or overhead cranes are tied up in rearranging weldment



They permit higher quality work at reduced cost — product appearance is improved — fillets and beads are smoother, neater, more uniform.

They increase employee safety — positioners eliminate the hazards of rehandling weldments.



P&H Model WP-3 positioner — Dual-capacity — 3000 and 4410 lbs. Available with constant or variable-speed table-rotation, and power elevation.

P&H welding positioners pay for themselves in a short time and start making money for you. They are available in capacities ranging from 2500 to 36,000 pounds. Investigate their money-making possibilities in your plant. Call in your P&H representative or send coupon for detailed information.

P&H

WELDING DIVISION
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

Uniform, top-quality electrodes for every job

Tear out this coupon and mail today

HARNISCHFEGER CORPORATION, Welding Division 2120
4513 W. National Ave., Milwaukee 14, Wis.

Please send me money-saving information on the complete line of P&H Positioners.

Name .....

Company ..... Title .....

Address ..... ☐Home ☐Business

City ..... ( ) State .....

EXCAVATORS • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZER • CRAWLER AND TRUCK CRANES DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

ATLAS

GIVES YOU "RE-BIT" ECONOMY IN BOTH THESE POPULAR STYLE TOOLS

DUAL-TOOL

● Fast replaceable brush, fast replaceable tip and all metal handle—typical Atlas quality throughout makes this the best of all dual purpose tools.

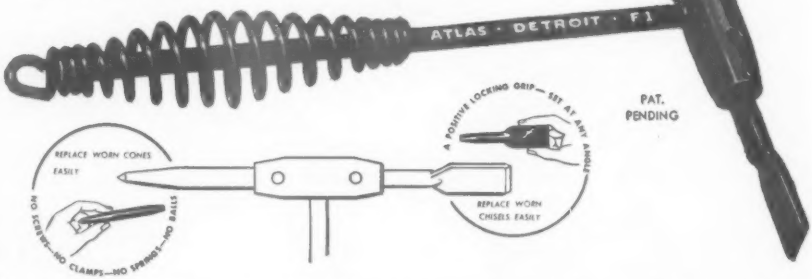
Available with wood or steel handle.

PAT. PENDING

TOMAHAWK

● Fast replaceable bits—use point and blade or 2 blades set in any position. The balance and solid feel of this Atlas Tomahawk along with its economy make it the most popular chipping tool to be introduced in years.

Available in two weights, each with wood or steel handles.


ATLAS · DETROIT · F1
REPLACE WORN CONES EASILY
NO SCREWS—NO CLAMPS—NO SPRINGS—NO BALLS
A POSITIVE LOCKING GRIP— SET AT ANY ANGLE
REPLACE WORN CHISELS EASILY

PAT. PENDING

The design that helps keep down tool costs!

- Fast replaceable wear parts
- Forged steel tool bits
- Induction hardened, diamond tested
- Handles silver brazed into heads for safety
- Balance and "feel" that reduces fatigue

Ask your Atlas dealer to show you these new tools.

Atlas WELDING ACCESSORIES COMPANY

707 E. LEWISTON AVENUE FERNDALE 20, (DETROIT) MICHIGAN

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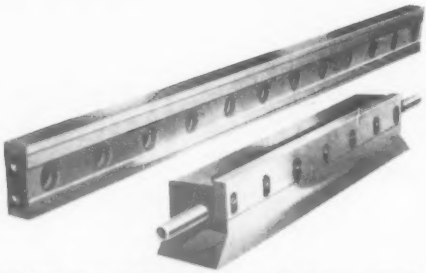

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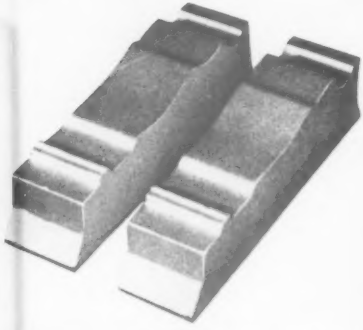

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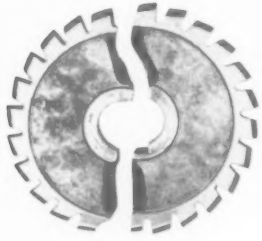

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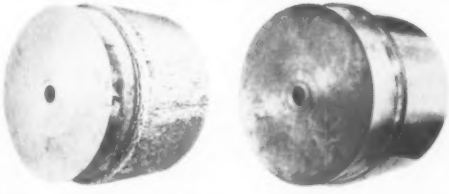

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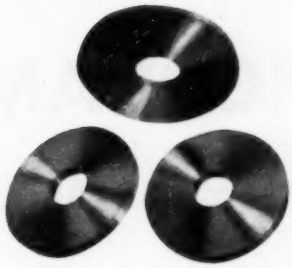

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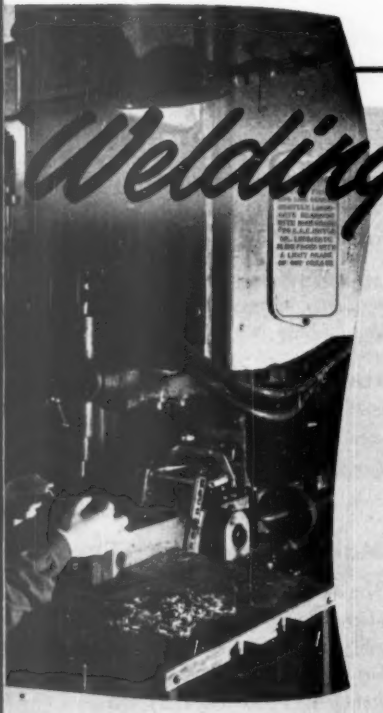

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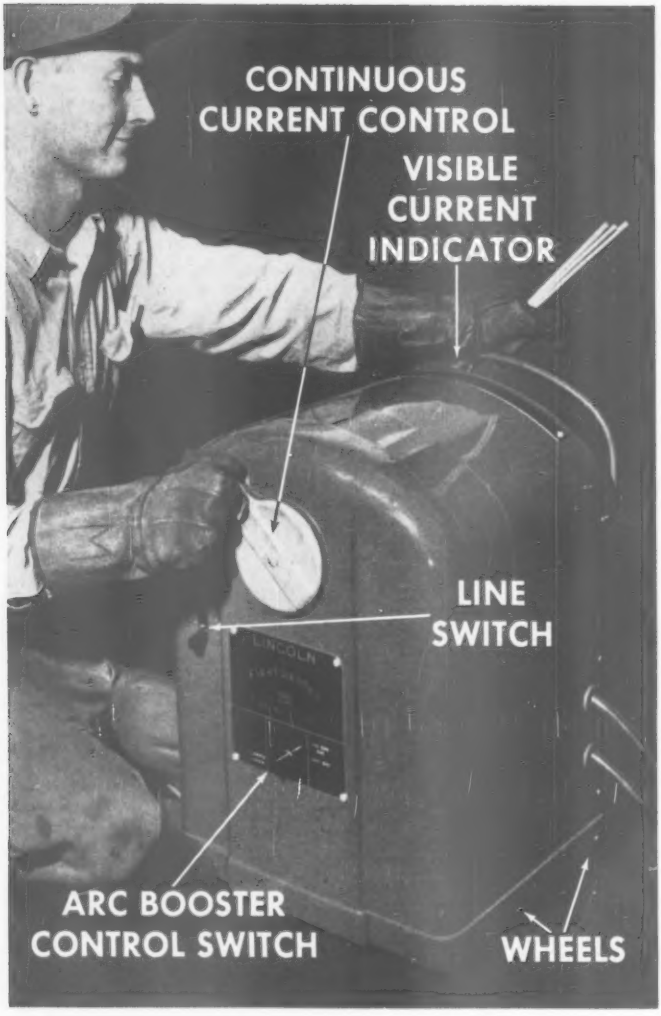

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ESTABLISHED 1916 THE WELDING ENGINEER OCTOBER, 1950

Who Does the Design?

OCTOBER's fourth week begins the annual convention of the American Welding Society in Chicago. This meeting will be jam-packed with papers on welding and welding developments. You would have to be at least triplets to take in everything on the program, but there is one feature you can't afford to miss.

It's the Design session, starting at noon on Tuesday, October 24.

Welding design is often treated like Charles Dudley Warner's remark on the weather (usually attributed to Mark Twain): "Everybody talks about it, but nobody does anything about it." It's all too often that way with welding design.

Too many plants leave their design problems up to the shop weldor. The weldor's job is to to join two pieces of metal. Even if he were also a design genius, he wouldn't be able to do a job unless he knew the service to which the weldment is to be subjected, the strength that is required and other vital information that is almost never supplied to him. So he goes ahead and just makes the weldment strong. As a consequence, the welding engineering done by shop men usually proves quite expensive because of the overly large safety factor.

This Design session will tell you what proper design for welding means and how it can save money for the fabricator and the ultimate customer. The results of proper design are more business, more profits and (now) more taxes. Taxes to the contrary, it is still worth while.

A design involves a great deal more than the correct calculation of stresses and the selection of the right materials and the best means of fabrication. It involves genius—or call it that for want of a better term. You'll get your best results if you first clearly understand the functions the product is to perform, and then approach the problem with a flexible, open mind. Unfortunately, that's not so easy to do. Your greatest tendency (and source of error) will be to make the new welded product look like something it's not.

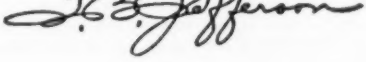
Because of the weight of past tradition, many designers will endeavor to make the welded design look like the object it is replacing. They don't know why they want to achieve this aim; it just seems right and that's that. You can usually flatter a designer if you tell him that his welded product looks just like a casting or a forging after it's been sandblasted. But that's no compliment. It's a statement of failure. Such a resemblance usually means that the designer has failed to take full advantage of the engineering freedom made possible by welding.

At this Design session, you will be afforded a firsthand opportunity to learn something practical. Authorities in the field will tell you the conditions under which welding offers production economies and will show you how it can be used to save materials, reduce fabrication time and turn out a product that's more durable, stronger, lighter and/or more pleasing in appearance.

In view of the world situation, the presentation of such a program could hardly be more timely. When the guns go boom, industry is faced with the old tough obstacles of increasing costs, shortages of materials and lack of manpower. The rocky road ahead may be smoothed considerably if your designers and engineers are acquainted with the fundamentals of welding design.

This Design session should help to start many new designers along the proper path. We urge you to attend so you may learn how the products of the future are going to be fabricated.

Besides the AWS Convention and the Metal Show, another important event in October is the Red Feather campaign. Just to remind you not to overlook it, we are reproducing the symbol on this page. The slogan, "Give enough," means just that. The Community Chest greatly assists in the support, or is the principal support, of all your hometown charities. Don't fail to make your contribution adequate!



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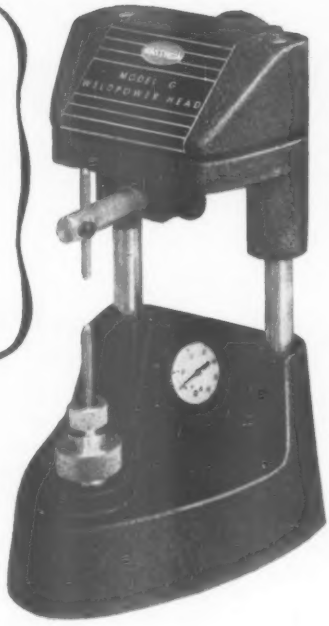

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See RAYTHEON Booth No. 2548 at National Metal Congress — Chicago, October 23-27

Convention Preview

Read this article if you plan to be in Chicago for the 31st AWS meeting October 22-27. If you won't be there, read it anyway just to learn what you'll miss.

BY CLYDE B. CLASON

HOTEL SHERMAN is headquarters for AWS. Get there Sunday afternoon for the President's Reception

TENTATIVE program of the American Welding Society's 31st annual meeting forecasts a heavy schedule of activities. There will be, at a rough estimate, from 10 to 15% more events to cover in the same length of time. Practically every available minute is scheduled, including evenings. The whoopee boys are warned to stay away: there won't be any playtime from Monday Oct. 23 through Friday Oct. 27.

The Hotel Sherman again serves as convention headquarters, as it did during the last Chicago convention in 1947. Registration will begin on Oct. 22, and the president's reception will be held on the traditional Sunday afternoon at 5 p.m. After this pleasant event comes the whirlwind.

Scheduled are another educational lecture series for three late-afternoons, a panel discussion on resistance welding, the annual Adams lecture, awards of medals and prizes, a symposium on applied welding engineering and an inspection trip. This is only the beginning. There will be 90—count 'em—technical papers presented at 24 technical sessions. To say nothing of the board of directors' meeting, business meeting, section officers' conference and university research dinner and conference.

If you have any spare time, you can spend it at the International Amphitheatre, located a healthy distance away from the Loop area. You can use Thursday evening or possibly Friday afternoon to go to the Metal Show. When it's all over and your train pulls out of Chicago, you will be a tired but considerably wiser man.

Special Events

The Adams lecture, the educational lecture series and the inspection trip have all been established as regular AWS convention features. Newcomers on the program are the panel discussion on recommended practices for resistance welding and the evening symposium on applied welding engineering.

The panel discussion, sponsored by the AWS Resistance Welding Committee, is scheduled for 2:00 p.m. Monday afternoon. J. Heuschkel, of Westinghouse Electric Corp., will serve as chairman, and J. H. MacKinney, of The Budd Co., as co-chairman. Both men will also present papers: Heuschkel on carbon and low-alloy steels and MacKinney on stainless steels. Other metals and alloys will be covered by the other speakers: W. J. Wilson, Lavelle Aircraft Corp., aluminum and magnesium alloys; J. B. Welch, Cutler-Hammer, Inc., copper alloys and dissimilar non-ferrous metals; R. M. Wilson Jr., The International Nickel Co., nickel and nickel alloys; E. A. Bussard, Coleman Co., Inc., clad and plated materials. Wilson Scott, of Westinghouse, and R. T. Gillette, of General Electric, will round out the discussion with talks on the historical background (Scott) and the keynote of quality (Gillette).

The symposium on the proper application of welding processes will be held at 8:00 p.m. Tuesday evening under sponsorship of the AWS Technical Activities Committee. C. D. Evans, International Harvester Co. and chairman of the Technical Activities Committee, will preside, and S. A. Greenberg, technical secretary of AWS, will serve as co-chairman. Evans will outline the scope of the symposium, and Greenberg will deliver the final talk on applications. Design, materials, workmanship and inspection will be covered, respectively, by J. J. Chyle, A. O. Smith Corp.; A. N. Kugler, Air Reduction Sales Co.; R. W. Clark, General Electric Co.; and J. Lyell Wilson, consulting engineer.

These events are mere accompaniment to the technical sessions, said to constitute the largest technical program in the history of the society. Eight morning and afternoon periods will be devoted to simultaneous sessions—the usual three-ring circus during each period. The periods are Monday morning and afternoon, Tuesday morning and afternoon, Wednesday morning and afternoon, Thursday morning and Friday morning. The inspection trip—to the Electromotive Division of GMC—will take place on Thursday afternoon.

Of the 24 technical sessions, three are allotted to resistance welding, two to ship structure and two to research. No other subject receives more than one session. One of the newer processes, inert-gas metal-arc welding, is the subject of a session that should prove of particular inter-

O. B. J. FRASER, AWS president, will preside on Monday night when the medals and prizes are awarded

est to those watching developments in this field. Automatic welding also merits a session of its own.

Monday Sessions

Monday morning sessions are on weldability, resistance welding and surfacing. R. E. Somers, Bethlehem Steel Co., is chairman of the weldability session, and L. C. Bibber, Carnegie Illinois Steel Corp., is co-chairman. Speakers and joint authors of the four weldability papers are: A. E. Flanigan, S. I. Bocarsky and G. B. McGuire, University of California; G. H. Enzian and G. J. Salvaggio, Jones & Laughlin Steel Corp.; W. H. Bruckner, University of Illinois; D. Rosenthal, University of California, and W. D. Mitchell, Douglas Aircraft.

Resistance Welding: Jack Ogden, Fisher Body Div., GMC, is chairman, and R. E. Powell, Western Electric Co., co-chairman. Papers will be given by J. Raymond Wirt, Delco Remy Div., General Motors Corp., production welding techniques; Franklin Page, Jr., Du Fresne and Page Engineering Co., and Frank Johnson, Unitek Corp., spot welding of thin materials; Donald H. Fleig, American Electric Fusion Corp., design and operation of tube mills; W. B. Kouwenhoven, The Johns Hopkins University, and W. T. Sackett, Jr., Battelle Memorial Institute, the spreading resistance of contacts.

Surfacing: T. B. Jefferson, editor of The Welding Engineer, is chairman, and R. L. Townsend, Tweco Products Co., is co-chairman. Four varied papers will be presented by H. S. Avery, American Brake Shoe Co.; O. E. Swenson, U. S. Naval Experiment Station; Eldon C. Hurt, Haynes Stellite, and H. E. Cable, The Lincoln Electric Co. Avery will talk on composite tungsten-carbide weld deposits; Swenson on the hard-facing of steam valve seats and disks; Hurt on production applications of hard-facing; Cable on composite metal fabrication.

Monday afternoon sessions are on flame-hardening; arcs, electrodes and fluxes; and research. A. F. Chouinard, National Cylinder Gas Co., is chairman of the flame-hardening session, and E. C. Brekelbaum, Harnischfeger Corp., is co-chairman. E. J. Cox, Pittsburgh Commercial Heat Treating Co., will cover the subject of commercial flame-hardening; J. J. Barry, Air Reduction Sales Co., the flame-hardening of large surfaces; Milton Garvin, Cincinnati Milling Machine Co., production flame-hardening.

Arcs, Electrodes and Fluxes: C. I. MacGuffie, General Electric Co., is chairman; H. E. Rockefeller, The Linde Air Products Co., co-chairman. Research techniques to study arcs in inert atmospheres will be discussed in a paper by Roger H. Gillette, The Linde Air Products Co., and R. T. Breymeier, Union Carbide and Carbon Research Laboratories, Inc. Albert Muller, G. R. Rothschild and W. J. Greene, all of Air Reduction Co., Inc., offer another joint paper on the characteristics of inert-gas-shielded metal arcs. The third paper on aluminum-magnesium filler metals for welding high-strength aluminum alloys is by R. D. Williams and D. C. Martin, of Battelle Memorial Institute.

Research: Perry R. Cassidy, Babcock & Wilcox Co., is chairman; F. L. Plummer, Hammond Iron Works, co-chairman. S. S. Tor, R. D. Stout and Bruce G. Johnston, Lehigh University, discuss room-temperature tensile tests as an index of transition temperature; H. C. Boardman, Chicago Bridge & Iron Co., interprets the work of the fabrication division, PVRC; L. J. Klingler, Case Institute of Technology, researches into sub-critical heating of low-carbon plate steel.

Tuesday Sessions

Tuesday morning sessions are on pipe fabrication, resistance welding and ship structure. Tuesday afternoon sessions are on resistance welding, design and ship structure.

Resistance Welding: Altogether, 11 papers will be given at the three resistance-welding sessions. T. Embury Jones, Precision Welder & Machine Co., is chairman of the morning session and R. C. McMaster, Battelle Memorial Institute, is co-chairman. At the afternoon session, B. L. Wise, National Electric Welding Machine Co., is chairman, and J. F. Randall, Ford Motor Co., co-chairman.

Authors of the Tuesday papers and their subjects are: J. W. Kehoe, Westinghouse Electric Corp., obtaining consistent resistance welds; I. S. Goodman, Westinghouse Electric Corp., variables in cross-wire welding of dissimilar metals; J. H. Cooper, The Taylor-Winfield Corp., spot and seam welding of aircraft materials with d-c; E. F. Nippes, J. M. Gerken and J. G. Maciora, Rensselaer Polytechnic Institute, projection welding of 0.010-0.020 in. steel sheet; Nippes, Savage, Patriarca and McCarthy, Rensselaer Polytechnic Institute, optimum flash-welding conditions; F. L. Brandt, Jr., Thomson Electric Welder Co., flash welding of non-ferrous metals; Nippes, Ramsey and Maciora, Rensselaer Polytechnic Institute, spot welding of scaly heavy-gage structural steel.

Ship Structure: Captain C. M. Tooke, Bureau of Ships, is chairman of the morning session, and Commander R. D. Schmidtman, U. S. Coast Guard, is co-chairman. Rear Admiral K. K. Cowart, U. S. Coast Guard, makes the opening talk. In the afternoon session, D. P. Brown, American Bureau of Shipping is chairman, and Finn Jonassen, National Research Council, is co-chairman.

Authors and co-authors of the

seven papers scheduled at the two ship structure sessions are: D. Vasarhelyi and R. A. Hechtman, University of Washington; E. W. Suppiger, Carlo Riparbelli and E. R. Ward, Princeton University; H. M. Banta, R. H. Frazier and C. H. Lorig, Battelle Memorial Institute; G. S. Mikhalapov, Metallurgical Research and Development Co., Inc.; William R. Campbell, Engineering Mechanics Section, National Bureau of Standards; John Vasta, Bureau of Ships, Navy Department. Stress studies, notch sensitivity, metallurgical aspects of ship steel quality and welded reinforcement of openings are among the subjects to be covered.

Pipe Fabrication: D. H. Corey, The Detroit Edison Co., is chairman, and E. R. Seabloom, Crane Co., is co-chairman. This Tuesday morning session opens with two papers on high-temperature, high-pressure piping. N. L. Navarre, U. S. Naval Engineering Experiment station, will discuss the development of a welding procedure for high-pressure steam piping, and H. J. Irrgang, Jr., W. K. Mitchell & Co., the fabrication and welding of high-temperature, high-pressure alloy piping. R. W. Emerson, Pittsburgh Piping & Equipment Co., will discuss the welding of 347 stainless steel. On the low-pressure side, Horace Jackson, Thompson Pipe and Steel Co., will talk on large-diameter long-span welded pipe.

Design: This Tuesday afternoon session begins with a special luncheon at 12:30 p.m. in the Bal Tabarin room of the Sherman. H. R. Morrison, chairman of the AWS Convention Committee, will introduce the featured speaker, G. F. Nordenholt, editor of *Product Engineering*. Nordenholt will keynote the session with his luncheon talk on design for production economies and will afterwards serve as chairman of the 2:00 p.m. technical session. H. W. Pierce, New York Shipbuilding Corp., will be co-chairman.

T. J. Crawford, Detroit consulting engineer, will discuss organization for design for production economy. Kenneth Jackson, Caterpillar Tractor Co., will cover the economies accomplished by redesign for welding and R. H. Bennewitz, The Linde Air Products Co., applications of welded design for cost reduction.

Wednesday Sessions

The Wednesday morning program includes research, educational and structural sessions. The structural session is under the chairmanship of L. S. McPhee, Whiting Corp., and A. T. Waidelich, The Austin Co. Papers are on: connections for welded rigid portal frames, by Anthony Topractsoglou, Lynn S. Beedle and Bruce G. Johnston, of Lehigh University; stress redistribution above the elastic limit for a welded frame, by L. E. Grinter, Illinois Institute of Technology, and Charles G. Peller, Valparaiso University; buckling of intermittently supported rectangular plates, by C. H. Norris, D. A. Polychrone and L. J. Capozzoli, Massachusetts Institute of Technology; welded eccentric girders for composite bridge construction, by R. E. Robertson, consulting engineer, Saxe, Williar and Robertson.

Education: Professor R. S. Green, acting chairman, department of welding engineering, Ohio State University, will serve as chairman of a symposium on the need of professional training for the welding engineer. Professor M. L. Begeman, University of Texas, will be co-chairman. The employer's point of view will be presented by J. Heuschkel, Westinghouse Electric Corp. (viewpoint of a representative of industrial research); A. G. Bissell, Bureau of Ships, Navy Department; J. J. Chyle, A. O. Smith Corp. (viewpoint of a representative of the fabrication industry); J. M. Parks, welding research, Armour Research Foundation (viewpoint of a representative of private research); G. E. Doan, professor of metallurgy, Lehigh University (viewpoint of a representative of an eastern private university); and R. A. Wyant, assistant professor, department of metallurgy, Rensselaer Polytechnic Institute (viewpoint of representative of a private engineering school).

The college point of view will be presented by G. S. Schaller, professor of mechanical engineering, University of Washington (viewpoint of a representative of a western state university). The papers will be followed by an authors' roundtable discussion.

Research: G. E. Claussen, Reid-Avery Co., is chairman, and O. T. Barnett, Metal & Thermit Corp., co-chairman. Professor Gilbert S. Schaller, University of Washington, will discuss manual metal-arc welding with the new rotary electrode. A trio of researchers from the Mechanical Engineering department, University of Texas—names: M. L. Begeman, B. H. Amstead and U. I. Mashruwala—offer a joint paper on the effects of reduced atmospheric pressures on arc-welding characteristics. Another trio from United States Steel Corp.—O. O. Miller, F. C. Kristufek and R. H. Aborn—cover the transformation of austenite in manganese-molybdenum steel deposited as weld metal. The final paper, on stress relieving and fracture strength, is by D. Swan, A. R. Lytle and C. McKinsey, Union Carbide and Carbon Research Laboratories, Inc.

Wednesday afternoon sessions are on machinery and maintenance; controls, standards; machine (automatic) welding. The machinery and maintenance session is chairmanned by R. E. McFarland, Western Electric Co., and co-chairmanned by J. C. Menzies, of J. C. Menzies & Co. Papers are on the manufacture of farm tractors, by J. L. Bucholz, International Harvester Co., Farmall Works; tubular sections in frame design, by E. J. DeWitt, Wallace Supplies Mfg. Co.; and electric utility welding in the shop and field, by David P. O'Connor, Department of Water and Power, Los Angeles.

Controls, Standards: J. Lyell Wilson, consulting naval architect, is chairman; Roger Clark, General Electric Co., co-chairman. J. F. Lincoln, The Lincoln Electric Co., will present suggested new welding standards. S. S. Katsef, U. S. Naval Engineering Experiment Station, has a paper on procedure approval tests, and Lew Gilbert, editor, *Industry and Welding*, a paper on better welding.

F. E. McAtee, Chicago Bridge & Iron Co., is chairman of the session on machine welding, and Amel R.

1950-51 Officers of AWS

HARRY W. PIERCE, president. Pierce is assistant to president, New York Shipbuilding, Camden

CHARLES H. JENNINGS, first vice-president, is manager of the Westinghouse welding department

FRED L. PLUMMER, second vice-president, is director of engineering of the Hammond Iron Works

Meyer, Graver Tank & Mfg. Co., co-chairman. E. L. Frost, Union Carbide and Carbon Research Laboratories, Inc., discusses submerged-arc welding with multiple electrodes in series. W. P. Hoffman, International Harvester Co., Wisconsin Steel Works, will tell about automatic welding in steel mill maintenance.

Thursday Sessions

The three Thursday sessions, all in the morning, are on non-ferrous metals, pressure vessels and aircraft. C. H. Jennings, Westinghouse Electric Corp., is chairman of the non-ferrous metals session, and A. M. Setapen, Handy & Harman, is co-chairman. Papers are by: John W. Mortimer, Whitlock Mfg. Co., welding aluminum with inert-arc d-c; E. M. Mahla and R. B. Hitchcock, E. I. duPont de Nemours & Co., effect of welding on the properties of titanium-carbon alloys; Harold Robinson and J. H. Berryman, Air Reduction Co., Inc., inert-arc metal-arc welding of copper-base alloys; Clinton E. Swift and E. B. Brown, The American Brass Co., copper-alloy brazing for production economy.

Pressure Vessels: W. B. Bunn, M. W. Kellogg Co., is chairman, and K. L. Walker, Foster Wheeler Corp., co-chairman. Stress concentration problems at atmospheric and elevated temperatures will be discussed by G. J. Green and D. H. Marlin, Dravo Corp. Multiple-layer submerged-arc welding is covered by L. C. Stiles and D. H. Curry, Chicago Bridge & Iron Co. S. V. Williams, A. O. Smith Corp., will give general procedures for fabrication. The welding of stainless-steel containers to meet sanitary standards is alloted to P. H. Mounts, Cherry-Burrell Corp.

Aircraft: Chairman of this session is J. B. Johnson, U. S. Air Force; S. L. Hoyt, Battelle Memorial Institute, is co-chairman. Papers include both simon-pure researches and practical production problems. In the latter category, H. A. Huff, Jr., and A. N. Kugler, Air Reduction Sales Co., discuss jigs and fixtures for inert-gas arc welding, and T. E. Piper, Northrop Aircraft, Inc., will talk on inert-arc welding in production. Basic problems in design for aircraft welding will be covered by J. Koziarski and K. B. Gillmore, Piasecki Helicopter Corp. A research team from Curtiss-Wright Corp.—A. W. Steinberger, B. J. DeSimone and J. Stoop—will evaluate factors influencing crack sensitivity.

Friday Sessions

The three Friday morning sessions are on inert-gas metal-arc welding; oxygen cutting; locomotives and railroads. G. O. Hoglund, Aluminum Co. of America, is chairman of the inert-gas metal-arc session, and S. M. Spice, Buick Div., GMC, is co-chairman. Applications of this newest welding process will be given by T. T. Watson and R. R. Rothermel, Lukens Steel Co. (nickel- and stainless-clad steels); W. G. Benz, Jr. and J. S. Sohn, Air Reduction Co., Inc. (austenitic nickel-chromium stainless steel); and H. T. Herbst, The Linde Air Products Co. (non-ferrous metals and high- and low-alloy steels). H. N. Hockensmith, Brown & Root, Inc., will discuss the construction of an aluminum tower for ammonium nitrate extraction.

Oxygen Cutting: E. B. David, Air Reduction Sales Co., is chairman and R. S. Babcock, The Linde Air Products Co., is co-chairman. R. O. Fish, Fairbanks, Morse & Co., discusses the use of electronically guided template-tracing devices. G. E. Bellew, Air Reduction Sales Co., talks on foundry applications for oxygen, acetylene and other gases. C. A. Heffernon, The Linde Air Products Co., covers production edge preparation and plate shaping. R. F. Helmkamp, Air Reduction Sales Co., has the final paper.

Locomotives and Railroads: H. E. Gannett, a consulting railroad engineer, is chairman, and John H. Hruska, another consulting engineer, is co-chairman. Papers are on the fabrication of main line and switcher locomotives, by Fred T. Perry, General Electric Co.; reclamation of Diesel-locomotive parts, by LaMotte Grover and R. L. Rex, Air Reduc-

tion Co., Inc.; economy of reclamation, by W. G. Muschler, Chicago, Burlington & Quincy R. R.; rehabilitation of ore cars, by J. F. Likarish, Great Northern Railway Co.

Adams Lecture, Prizes

The traditional Monday evening session for the award of prizes and medals is chairmanned by O. B. J. Fraser, president of the American Welding Society, and co-chairmanned by H. R. Morrison, chairman of the Convention Committee. C. H. Jennings, Westinghouse Electric Corp., will deliver the 1950 Adams lecture. His subject: "Dynamic Characteristics of D-C Welding Machines."

The educational lecture series, under the chairmanship of Dr. Gilbert E. Doan, of Lehigh University, will cover the properties, design, procedure, inspection and application of the three chief non-ferrous metals. The lectures will be held on Monday, Tuesday and Wednesday afternoons, beginning at 4:30 p.m. Fred L. Plummer, Hammond Iron Works, presides over the Monday lecture on aluminum, given by G. O. Hoglund, engineer, Aluminum Co. of America. The Tuesday lecture, on copper, will be given by J. R. Hunter, manager, welding section, research department, Revere Copper and Brass Co., Inc. D. H. Corey, Detroit Edison Co., presides. The Wednesday lecture, on nickel, is by R. M. Wilson, Jr., welding engineer of International Nickel Co., Inc. J. J. Chyle, of A. O. Smith Corp., presides.

Wednesday evening will be held open for the section and national officers' dinner at 6:30 p.m., and the business meeting and section officers' conference beginning at 7:30 p.m. Simultaneously, the university research dinner will be held at 6:30 p.m., and the university research conference at 7:30 p.m.

A board of directors' luncheon and meeting will be held at 12:30 p.m., Thursday. There will be no annual banquet this year.

New Officers

No opposition has appeared to the official ticket selected by the 1949-50 Nominating Committee. The Society's 1950-1951 officers, therefore, will be:

Harry W. Pierce, president; Charles H. Jennings, first vice-president; Fred L. Plummer, second vice-president; and Russell S. Donald, treasurer. Mr. Pierce, who is now first vice-president, is assistant to the president of New York Shipbuilding Corp., Camden, N. J. Mr. Jennings, who moves up from second vice-president, is engineering manager of the welding department, Westinghouse Electric Corp., Buffalo. Mr. Plummer, the new second vice-president, is director of engineering of the Hammond Iron Works, Warren, Pa. Treasurer Donald (three-year term) is a sales engineer for the Thomson Electric Welder Co., with offices in New York City.

New directors at large (term three years) will be: LaMotte Grover, structural welding engineer, technical sales division, Air Reduction Sales Co., New York City; Harry E. Rockefeller, assistant manager, development division, The Linde Air Products Co., New York City; J. R. Stitt, research and welding engineer, The R. C. Mahon Co., Detroit; C. B. Voldrich, in charge of welding research, Battelle Memorial Institute, Columbus, O.

New district vice-presidents will be: A. G. Bissell, civilian head of the welding and metals branch, Bureau of Ships, Navy Department; Thomas J. Crawford, consulting engineer, Berkley, Mich.; and A. E. Wisler, welding engineer, Hughes Tool Co., Houston, Tex. Mr. Bissell represents district No. 2 (middle eastern), Mr. Crawford district No. 4 (central) and Mr. Wisler district No. 6 (mid-southern).

District representatives who will serve on the 1950-51 Nominating Committee are: No. 1 (New York and New England), Clarence E. Jackson, research metallurgist, Union Carbide and Carbon Research Laboratories, Niagara Falls, N. Y.; No. 2 (mid-eastern), Louis Ames, technical sales representative, Air Reduction Co., Philadelphia; No. 3 (southern); D. H. Curry, welding engineer, Chicago Bridge & Iron Co., Birmingham, Ala.; No. 4 (central) J. R. Stitt, The R. C. Mahon Co., Detroit; No. 5 (mid-western) W. Gerard Fassnacht, assistant chief metallurgist, Bendix Products Div., Bendix Aviation Corp., South Bend Ind.; No. 6 (mid-southern) A. K. Pandjiris, president, Pandjiris Weldment Co., St. Louis; No. 7 (western) Charles L. Haynes, staff consultant, C. F. Braun & Co., Alhambra, Calif.

Make Your Points Penetrate

No. 6 in a series of inspirational talks on "Twelve Self-Assignments to Sales Success"

BY RICHARD C. BORDEN

DURING the critical final moments of a selling interview, what counts is not how much you've said but how much of it your customer REMEMBERS!

You've got to do more than just *present* your points. You've got to *drive them in* . . . with the hammer of good visual showmanship.

To that end, make it your assignment this month to carry with you, into your customer's presence, all usable displays, parts, samples, test kits, photographs, diagrams and testimonials. Be particularly sure you do this in the case of the customer "pals" you know most intimately . . . so intimately that perhaps you've gotten into the habit of calling on them empty-handed, unarmed with the tools of selling.

True, faithful execution of this month's assignment may mean you'll be lugging around a briefcase a little heavier than it otherwise might be. But that extra weight is worthwhile weight.

Without it, you're like a man trying to drive in a spike with a tack hammer. With it you have what it takes to make your selling points PENETRATE.

These articles, published once a month in The Welding Engineer, *are based on the script of a Darnell-Borden series of sales films, "Selling against Resistance."*

INTERNATIONAL AMPHITHEATRE, Stockyards district, Chicago, is the scene for the . . .

32nd Metal Show

"High Productivity" is the theme of the coming National Metal Congress and Exposition, Chicago, Oct. 23-27. Exhibits, movies, demonstrations, conferences, forums, clinics and seminars will round out a busy week.

BY WALTER MORRISON

THE big annual event of the metalworking industries will be held this year at the International Amphitheatre, W. 42nd and S. Halsted streets, Chicago, beginning on Monday Oct. 23 and continuing through Friday Oct. 27. "Materials and Equipment for High Production" is the timely theme.

Approximately 350 nationally known firms engaged in either the production of metals, the treatment of metals, the fabrication of metals or in rendering services to firms engaged in these businesses will exhibit at the 32nd National Metal Congress and Exposition. Over 200,000 sq ft of floor space have been assigned.

Technical meetings of the four sponsoring societies will be held during the week at the Palmer House, Sherman, Sheraton and Morrison hotels.

Special Events

Seminar on Atom Movements. This is scheduled for the two days preceding the Metal Show proper. Sessions will be held at the Palmer House, 9:30 a.m. and 2:00 p.m., Saturday Oct. 21 and 9:30 a.m. and 2:00 p.m., Sunday Oct. 22. Twelve papers will be presented on such subjects as "Formal Basis of Diffusion Theory," "Chemical Techniques and Analysis of Diffusion Data," "Diffusion and High Temperature Oxidation," "Diffusion in Sintering," "Boundary Movements," etc.

ASM Business Forum. Top management executives of metals producers and of the five principal metals-consuming industries will get together for this forum at the grand ballroom of the Palmer House, Thursday Oct. 26. Leaders from the automotive, railroad, agricultural implement, electrical and chemical industries will participate in discussion bearing on the present problems and future prospects of metal working. The producers of both ferrous and non-ferrous metals will report on the needs and opportunities for expanding present plant facilities and on what's liable to happen to domestic and foreign supply should the present world tension grow even worse.

ASM Sales Clinic. Also at the Palmer House will be a sales clinic conducted for industrial exhibitors and others interested. The clinic will be broken down into two sessions: on Sunday Oct. 22 at 8 p.m. and on Tuesday Oct. 24 at 9 a.m. The first session will discuss selling through the medium of industrial exhibits and the Tuesday session will take up the more general aspects of selling, advertising and marketing within the metal-working field.

1950 Educational Lectures. These will be held Monday, Tuesday and Wednesday from 4:15 p.m. to 8:00 or 9:00 p.m. The Monday lecture, on the high-temperature properties of metals, will include discussions of stress rupture testing, fatigue, creep, service experience and oxidation. The Tuesday session will correlate the test findings of laboratories with actual service performance. The Wednesday lecture is devoted entirely to the metallurgy of titanium. Topics slated for coverage are: the development of ductile titanium, the iodide dissociation process, magnesium reduction process; melting, casting, working, fabrication and testing; alloys of titanium.

ASM Metallographic Exhibit. A

(Continued on page 72)

How to Get There

TO GO from Hotel Sherman to International Amphitheatre, take a southbound No. 42 (Halsted-79) car on Clark St. After 6:15 p.m., walk two blocks east to State St. and take a southbound No. 44 car (Racine-87) direct to International Amphitheatre.

Also, the management of the Metal Show plans to run special buses between the downtown headquarters of the four societies and the Amphitheatre. Proposed schedule provides transportation both ways at 20-minute intervals during the day and during the evening hours when the exhibits are open. Tickets will be available at the hotels.

Trends in a Changing World

If you want to keep pace with welding in a changing world, you'll need knowledge in many fields. This study presents the trends in population, industry, the industrial worker and the welding market.

BY T. B. JEFFERSON

LIKE TOPSY, the welding industry has "just growed." But its growth has been amazing when you consider the importance that welding has assumed in the metal-fabricating industries within the short period of sixty years.

This modern means of joining metal began to see its first practical applications in the late 1890's and the early 1900's. Oxyacetylene and later arc and resistance welding represented a new and practical way to join metal parts—the natural evolution that might have been expected when man began to work with metals universally.

Since our early automobiles retained the bodies of horse-drawn coaches, it is only logical to assume that when man first began to put metal parts together he would join them as he had learned to join wood parts—by pegs, pins, screws, etc. Later on, the metal parts were hot riveted, but this was no more than a modification of the old pin joint.

Not until the development of welding was there achieved a means of fabrication peculiar to metals and not to wood. Wood could not be fastened together without pins, nails or dovetailing, but two pieces of metal could be joined so as to make a homogeneous structure.

Gradually more and more people became acquainted with the advantages of welding. Applications expanded until now more than 1% of this country's population derives its living from the use of welding and related processes.

Despite the large volume of business done every year, no one has hitherto made a thorough study to discover just where welding equipment sales are and where most welding is being used. THE WELDING ENGINEER has attempted to find out.

Everyone knows, of course, that the 39 welding processes and the ten flame-treating processes are used in the primary metals industry, in transportation industries, in machinery manufacture, in the fabrication of sheet metal, in shipbuilding, etc. But who uses what process, what for and how much? Answers to these questions have been earnestly sought by the manufacturers and distributors of welding equipment—people who must earn their livelihood by selling welding machines, accessories, supplies and equipment. A person interested enough would work out some sort of answer. Even the most knowledgeable, however, lacked statistical information.

WHERE WELDING IS USED

In the first comprehensive survey ever made of welding in the metals industry, THE WELDING ENGINEER undertook to determine where welding was being used. It was our aim to discover what welding processes were employed in the different plants and if welding was being used for maintenance or production applications. The survey, for obvious reasons, was limited to the metals and metal-products industries.

The McGraw-Hill Census of Manufacturing Plants shows 13,109 plants in the metals industry employing 51 or more workers. Though this number represents only 21% of the plants in the metals industries, those 13,109 plants represent 85% of the working population employed. Hence it is easy to see that the bulk of the products of the welding industry are consumed by a relatively small number of plants in the various industries to which they sell.

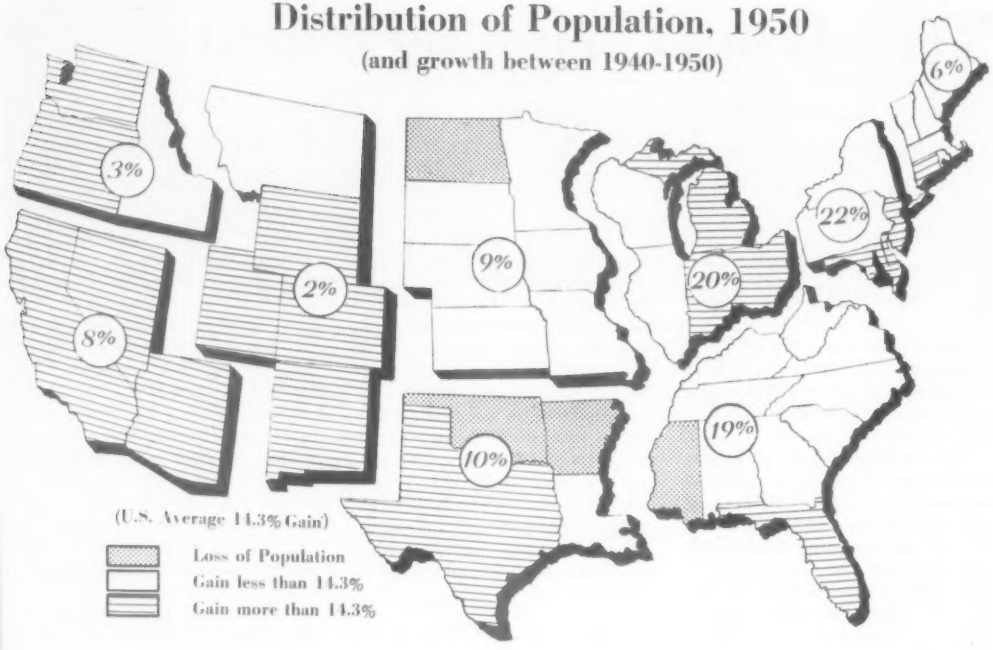
Like many other industries, welding needs an accurate yardstick to select the plants that offer the greatest potential, either from a sales or from an employment standpoint. A basic knowledge of these primary markets would make it possible to develop effective sales controls.

To determine a plant's relative importance to an industry, it is necessary to compare its worker total with those of other plants making the same type of products. Two plants of the same size (number of workers) in the same industry would tend to produce the same total value of goods. Granted this fact, it is reasonable to assume that these two plants would buy about the same total amount of welding equipment and, by the same token, employ the same total of weldors. So any survey that is to be worth anything must establish: (*a*) what products does the plant make? and (*b*) how many employees does it have?

THE WELDING ENGINEER surveyed 10,495 of the 13,109 industrial plants employing 51 or more workers in the metals and metal-products industries. Of these 10,495 plants, 85% used welding for either production or maintenance or both. Of the 85% using welding, 92% used either arc, gas and/or resistance welding for maintenance applications, and 72% used one or more of the three welding processes for production.

Naturally, the sales of welding equipment are not confined to the plants of the metals and metal-products industries. Welding will be used for maintenance wherever machinery is used—in agriculture, in mining, in construction, by public utilities and in the service industries as well as in all types of manufacturing plants from textiles to breakfast foods. Manufacturing activities present the major welding market, but the many maintenance applications also represent an important market for welding equipment. They also offer an important employment market.

The ever-expanding construction field presents another big demand for welding. Here, again, the important use has been for maintenance applications. More and more, the construction industry is becoming aware of the advantages of welding as a means of putting up bridges and buildings. Before this market can be tapped to its fullest extent, however,



some organization will have to do a tremendous educational job among contractors, engineers and architects. It will also be necessary to educate local, state and government officials on the practicability of welded construction and the authoritativeness and reliability of the various codes and specifications that have been developed for welded structures.

The mining industry, with its many ramifications, has readily taken to welded equipment. Without welding, the coal and various ores mined today couldn't be produced nearly as efficiently as they are being produced.

Oil is today the lifeblood of a nation. Welding is in every phase of the production and refining of petroleum products. Welded casings and pipe lines provide the transportation arteries for the circulation of crude oil from down deep under the earth to the refinery. Welded machines convert the crude oil into usable products; other welded transportation arteries carry these products to the ultimate consumer. A network of pipe lines has been and is being laid to bring natural gas to all parts of this great land of ours. These big pipe lines couldn't exist without the extensive use of welding.

America Grows

WARS AND DEPRESSIONS notwithstanding, this great land of ours is growing rapidly. The census takers' latest check indicates that over 150,520,000 people are now living in the United States. Over 61 million are in the nation's working forces.

Our country's population has increased 14.3% in the past ten years. Only four states—Arkansas, Mississippi, North Dakota and Oklahoma—have suffered a population loss. Nineteen states equaled or exceeded the national average. Who is at the top? Well, California first with a 51% gain, followed closely by Florida, which gained 45%, and Arizona with a 43% gain.

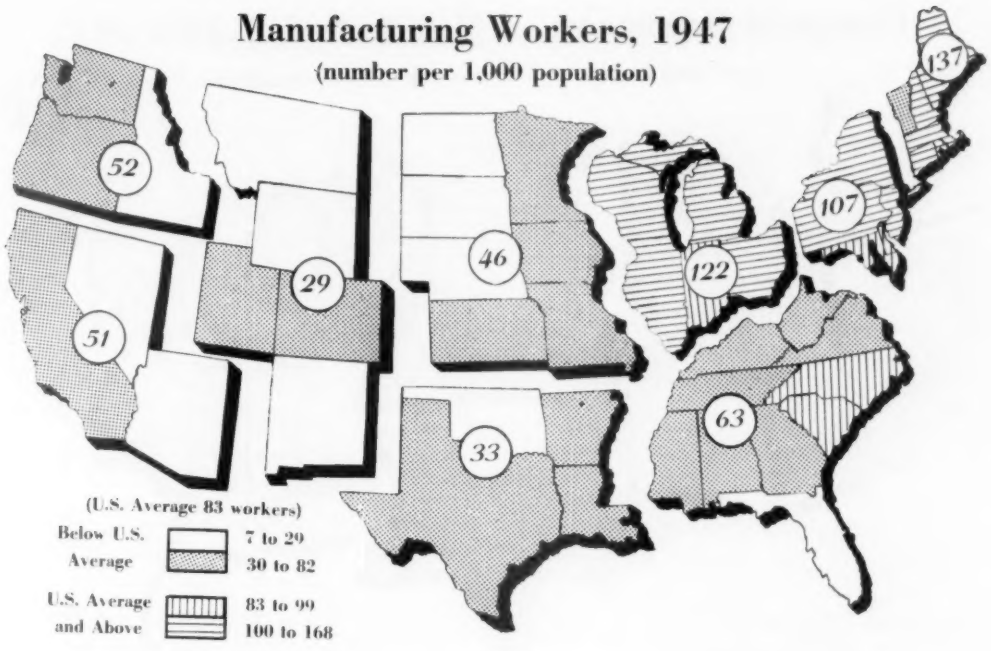
Welding has become so indispensable that there must be welding operations wherever there are people. Hence the trend of population may be a first approximation to the trend of welding. The above map pictures the distribution of population in the United States in 1950.

Almost half—to be specific, 48%—of the nation's population is in the three regions located east of the Mississippi and north of the Ohio and Potomac rivers. Approximately 19% is in the area immediately south. In all, over two-thirds of the people of this country still live east of the Mississippi river.

The two rapidly growing Pacific regions now have over 10% of the nation's population. The remaining 20% live in the mountain states and in the great plains area west of the Mississippi.

East has the bulk of the people, but is she going to keep them? A closer study of the population map indicates that most of the Eastern states have failed to meet the national average in maintaining their population growth. In New England, only Connecticut was able to keep pace. In the Southeast, all states but Florida had a smaller share of the national population than they did ten years ago.

The ten leading states from the 1950 population standpoint are: (1) New York; (2) California; (3) Pennsylvania; (4) Illinois; (5) Ohio; (6) Texas; (7) Michigan; (8) New Jersey; (9) Massachusetts; (10) North Carolina.



Workers—a Nation's Wealth

WE FIND 81% of the nation's metal and metal-products plants in an area having only 48% of the population. This area is made up of those three geographic sections located east of the Mississippi river and north of the Ohio and Potomac rivers (see map), roughly the same as the "North" of Civil War days.

It is from this area that welded products flow to all portions of the country. In this area a goodly percentage of our welding market is located.

According to the latest available figures, based on the 1947 Census of Manufacturers, approximately 39% of U. S. metal plants are located in the five states of the East North Central region, 31% in the five-state Middle East region. New York has the greatest total number of plants of any one state: over 11,900 plants in the metals field, 1,837 of them employing more than 51 people.

From a regional point of view, high development of manufacturing is commonly associated with a uniformly good level of income. Manufacturing provides direct job opportunities, obviously, and affords immediate markets for the products of the farm, forest and mines. It also creates employment opportunities in the professional field and service activities—retailing, wholesaling, finance and construction, for instance.

Accordingly, the degree of industrialization must be significant in any regional comparison. Let us define that degree as the relative importance of manufacturing in the whole scheme of an area's economic activities. You can measure the relative importance of manufacturing in an area by the number of manufacturing workers per thousand population. The higher the number of workers in relation to the population, the greater the degree of industrialization.

First, let us look at the United States as a whole in 1947. The national average was 83 manufacturing production workers per thousand population. Using this as our yardstick, we find that New England is the most highly industrialized region. In New England there were 137 manufacturing production workers per thousand of population. Only two other regions exceeded the national average—the Middle East and the East North Central regions. Again, we find that the pattern holds true—business is where the people are.

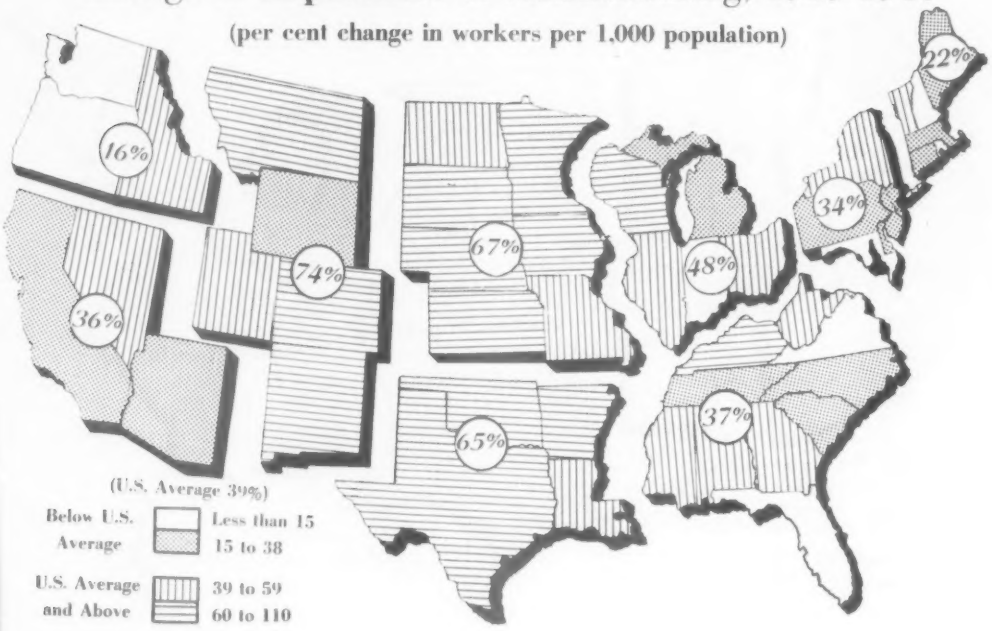
The Southeast has 63 workers per thousand and is slightly ahead of the two Pacific Coast regions. Despite recent spectacular growth, the Pacific areas do not yet rank among the more highly industrialized areas.

On a state-by-state basis, there is a wide range in the number of manufacturing productive workers—from as few as 7.4 industrial workers per thousand population in North Dakota to 172 per thousand in Rhode Island.

Ten states (all in the East) have more than a hundred factory workers out of every thousand population. Seven states—North Dakota, South Dakota, New Mexico, Wyoming, Arizona, Nevada and Oklahoma—have less than 25 manufacturing production workers for each thousand population. Those states having less than 50 manufacturing workers per thousand population may be identified as predominantly agricultural in their economy.

Change in Importance of Manufacturing, 1939-1947

(per cent change in workers per 1,000 population)



Industrial Growth

THE ABOVE MAP indicates the manner in which manufacturing has become more important in some areas and less so in others. The degree of industrialization was measured by comparing the number of manufacturing production workers per thousand population in 1947 with the comparable figure for 1939, a prewar year. The change in number of manufacturing production workers indicates a definite trend.

As previously indicated (see page 41), the 1947 national index was 83 workers per thousand. In 1939, it was 23 workers less or only 60 per thousand. Taking the 1939 figure as a base, this represents a 39% increase in the industrialization index between 1939 and 1947. Let us compare the various regions with this marked national increase to determine how they have kept pace.

Of the nine geographic regions, four exceeded the national average and five fell behind. The Intermountain region, least important of the nation's industrialized areas, shows the greatest rate of increase for the eight-year period. In the Intermountain region, the increase in the number of industrial workers per thousand population has been nearly twice that of the national average —74% as compared to the national average of 39%. The West North Central and West South Central regions, also previously noted for their low industrialization, are giving excellent indications of catching up. These two regions both exceeded the national average. The only one of the highly industrialized regions to exceed the national average increase was the East North Central region.

Two states in the West North Central region, it is interesting to note, had a more than 80% increase in the index from 1939 to 1947. These are Kansas and Nebraska. Nebraska had the greatest percentage gain of any state—110.2%. In the Intermountain region, the two leaders were New Mexico with a 93% increase and Colorado with an upward change of 87% in the eight-year period. Kentucky in the Southeast region was up 82%. Altogether, there were five states to show an increase of 80% or more in the index between the years 1939 and 1947. All of these states, however, started from an extremely low rate of industrialization in 1939, and they are today still predominately agricultural.

The worst setback in industrial progress was experienced in Virginia. Here the number of manufacturing production workers dropped from 49 per thousand in 1939 to 30 per thousand in 1947—a loss of 39%. Florida did not lose any workers but gained only 2.2% in the index—the smallest increase of any of the states. Other states on the low increase side were Indiana (3.6%) and Washington (9.2%). All other states had an increase of 10% or more.

As everyone knows, the Pacific Coast states experienced great growth of manufacturing facilities during the war years. Even so, they failed to keep pace with the average increase in the national index. This interesting phenomenon may be attributed to the fact that the populations of these states grew faster than their manufacturing. The conclusion is inescapable: the manufacturing growth of the Pacific states has not kept pace with their growth in population.

Industry Moves West

In 1939, there were 7,808,000 manufacturing production workers in the industrial plants of the United States. By 1947, this number had increased to 11,916,000. To put it in percentages, for the nation as a whole during the years 1939-1947, there was an average increase of 53% in the number of manufacturing production workers.

On the basis of these Census of Manufacturers (1947) figures, 24 states and six regions exceeded the national average, while 23 states and three regions fell below it. Missouri, had a rate or growth exactly equal to the average of the United States.

The increase in industrial production workers follows closely to the pattern found in the increase in overall population (page 40). The greatest growth was west of the Mississippi river. The Pacific Southwest states led with an average increase of 95%, due largely to the phenomenal growth of industry in and around Los Angeles. The Pacific Northwest states exceeded the national average, if only by a single percentage point. Traveling east of the Mississippi, we find that only the East North Central states—Wisconsin, Michigan, Illinois, Indiana and Ohio—exceeded the national average. Manufacturing facilities are large in these states, and they beat the national average by ten points—a total increase of 63%.

The Southeast has been growing in industrialization since the turn of the century. However, it failed to keep pace with the rest of the nation during the 1939-47 period. Of the Southeastern states, only Kentucky and Alabama exceeded the national average.

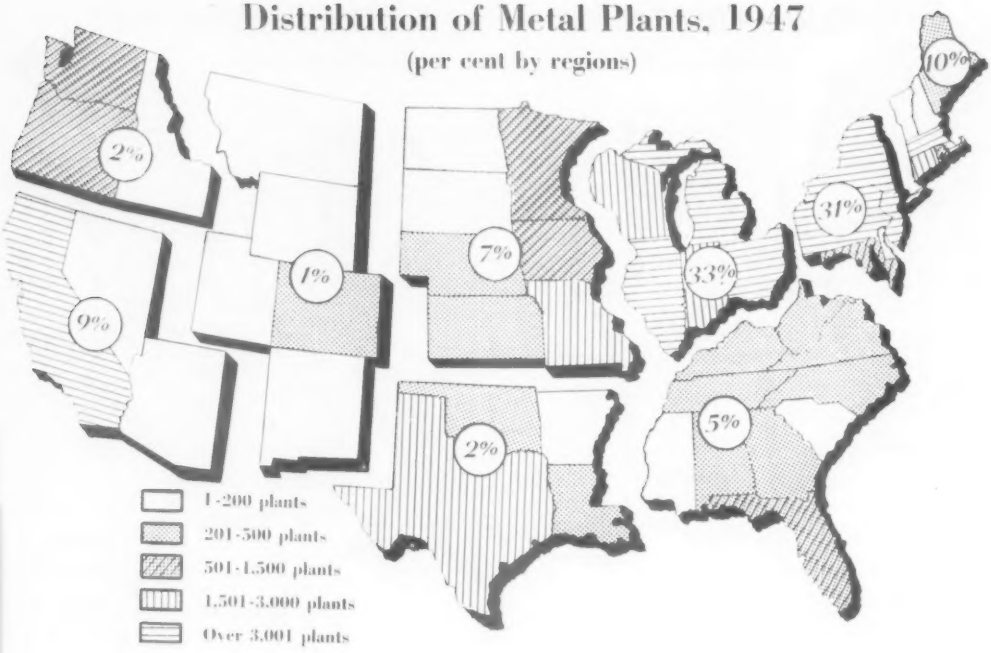
The lowest rate of growth was in New England, which showed a gain of only 32% in the number of manufacturing production workers. No New England state showed a gain equal to the national average, though Vermont fell only three points below the national average.

Percentagewise, the greatest industrial growth of any state was in Nebraska, 106% gain. Nevada and New Mexico tied for second place, each having a gain of 100%. Does that mean that these three states are the coming industrial areas? Not necessarily. Their actual gains—as contrasted with percentage gains—were low.

In the case of Nevada, for instance, the actual gain was only 1,000 industrial workers. Another example of the discrepancy between percentage figures and actual growth is found in Arizona; there was an 83% gain in the number of manufacturing workers, but the actual increase in the number of workers was only 5,000. On the other hand, California's 96% gain represents an increase of 259,000 workers.

Wisconsin leads all of the states east of the Mississippi river with a 72% increase in industrial workers. New Hampshire and Rhode Island showed the smallest increases, 20% and 21% respectively.

Let's look at the nine most highly industrialized states. California leads in the rate of growth, followed by Indiana, Ohio, Illinois, Michigan and New York, in that order. New York, though last in percentage gain in the above list, accounted for the greatest increase in actual number of workers. Industrial workers in the Empire State increased by 476,000 during the 1939-47 period.



Industry Is Here

IN THE DECADE from 1940-1950 our nation's labor force increased from 49.4 million to 61.5 million workers. A major part of this increase may be attributed to the demand thrown on all types of industry during the war. The scarcity of consumer goods resulted in inflation and in unprecedented demand after the war for everything from paper clips to automobiles.

According to the Department of Commerce figures, in 1947 there were 66,219 plants employing one or more individuals in the metals and metal-products industries. The above map shows how they are distributed by regions. Previously (pages 42 and 43) we have indicated the manner in which industry has grown and the direction in which it is moving.

No matter what the trend is, the East North Central region now leads all sections of the country in the metals and metal-products field. Some 33% of the country's plants are located in this area. Illinois alone has 7,388 metals and metal-products plants—more than any other state except New York. Of the Illinois plants, 1,472 employ 51 or more people, and over 1,100 (on the basis of THE WELDING ENGINEER survey) use welding for production or maintenance. These larger Illinois plants employ over 12,000 weldors.

All of the states in the East North Central region have in excess of 1,900 plants per state. Wisconsin, the low state, has just 1901. Ohio ranks next to Illinois with 5,445 metals and metal-producing plants (1,501 with over 51 employees), and Michigan is third with 5,086 plants (1,062 employing more than 51 workers).

The country's other big region for metals fabrication is the Middle East, which has 31% of the plants. Here we find New York state with 12,000 plants, leading every state of the union. In larger plants, New York is not so far ahead of Illinois; only 1,837 of the 12,000 employ 51 or more workers.

On the map, each state is identified as falling into one of five categories (see legend). Fifteen states have less than 200 plants; 13 states 201 to 500; seven states between 501 and 1,500; five states 1,501 to 3,000. Eight states have over 3,000 plants; we have already mentioned Illinois, Ohio, Michigan and New York; the others are Pennsylvania, New Jersey, Massachusetts and California.

The Intermountain states show up as the least industrialized region in the country. Colorado has the greatest industrialization of any mountain state with 402 plants, 56 employing 51 or more workers, Wyoming is at the very bottom of the list, both for its region and for the country, with but 15 metals or metal-producing plants, of which only three employ more than 15 workers.

While this map presents a true picture of the industrial field, it does not take into consideration the extensive use of welding made by the service, construction and mining industries. These other industries also represent an important market for welding equipment, accessories and supplies. Hence we must search further to obtain fuller and more accurate information on the extent of the welding market. How the country's welding dollar is divided up by regions is pictured on the opposite page.

Here Is the Welding Market

LIKE INDUSTRIAL activities in general, the country's welding market has changed over the years. Before considering the regional character, however, it might be advisable to look at the size of that market. The Mid-June issue of THE WELDING ENGINEER reported how the dollars went in 1949 for welding equipment and supplies. The 1949 total was $320,869,119. Of this amount, $234,286,716 was spent for gas welding and flame-cutting, including equipment, accessories, supplies and welding gases. Arc welders, electrodes and accessories were purchased to the extent of $66,068,710. Resistance-welding purchasers for machines, electrodes and controls totaled $20,513,639.

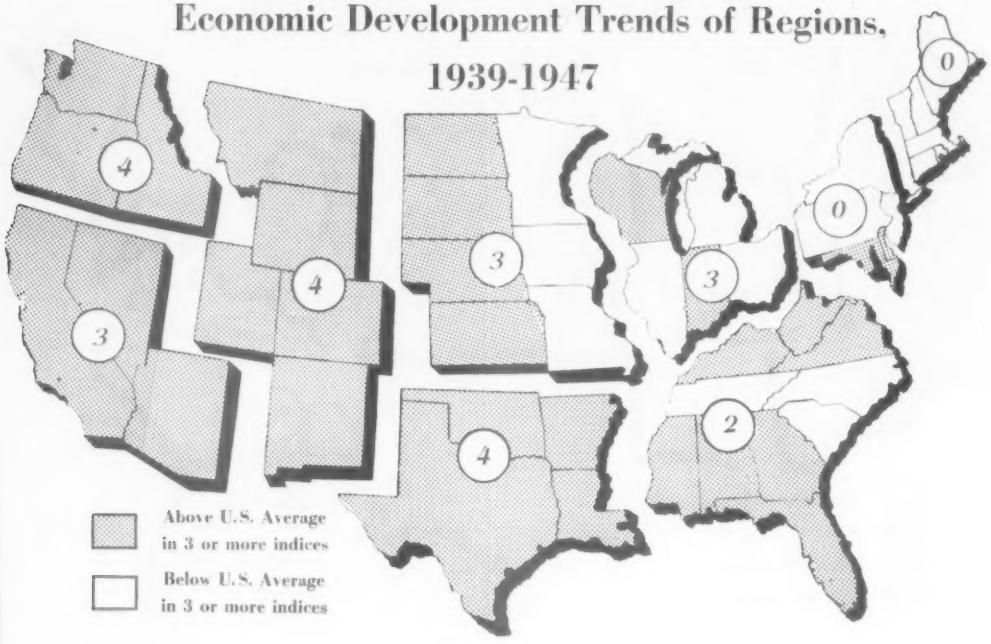
Though 1949 did not break any sales records for any of the three major branches of the welding industry, it wasn't a bad year. For welding gases, it was a very good year: 14 2/3 billion cu ft of oxygen and 5 billion cu ft of acetylene were produced, accounting for $207 million of the gas welding industry's $234 million. Sales of arc welders and electrodes were off and so were sales of resistance welders. Nevertheless, the total $320,869,000 is a healthy and hefty sales volume.

How the industry's $320 million volume was divided regionally is indicated on the above map. Thirty-four percent of the total sales of the welding industry went into the East North Central region, comprised of five states: Illinois, Indiana, Ohio, Michigan and Wisconsin. The five Middle East states of New York, Pennsylvania, New Jersey, Maryland and Delaware purchased 24% of the total goods sold in the welding market. The third largest welding market is represented by the Southwest Pacific states, which accounted for 11% of the total purchases. Closely behind, however, were the West North Central states and the West South Central region. The Intermountain states represented the smallest sales volume for the welding market (2%), though the Southeastern region exceeded them by only one percentage point.

Industries of ten states, including all five states of the East and North Central region, purchased in excess of $10 million of welding equipment, supplies and gases per state. The industries of four states purchased between $5 million and $10 million. Seven states represent a welding market valued between $2 and $5 million per state. In the Intermountain area, there is insufficient industry to bring any state's welding purchases over the $2 million mark.

Michigan is especially notable: it represents the greatest single-state sales volume for both arc and resistance welding equipment. Pennsylvania is the greatest user of the products of the gas welding industry. The industries of Nevada spend the least for welding and cutting equipment, supplies and accessories.

Industry surveys estimate that 87% of the accounts for the purchase of welding equipment and materials are handled by the country's 1,607 welding supply distributors. These distributors are reportedly doing 58% of the business of the welding field. Direct sales to industry are, on the whole, concentrated in a few of the large industrial metropolitan centers, such as Detroit, Chicago, Pittsburgh, Los Angeles and New York, where big plants are located.



A Look to the Future

THOUGH it's difficult to see just what is ahead of us, it is possible to predict a trend. This look to the future is based in part on a Department of Commerce study and in part on a report, "What Can Happen in the Next Ten Years?" prepared by the McGraw-Hill department of economics.

The Department of Commerce study correlates a number of indices to determine the economic development trends by regions on the basis of what happened during the 1939-1947 period. These indices are: (1) growth in population, (2) increase of total income payments to individuals, (3) increase in per capita income, (4) increase in manufacturing workers per thousand population and (5) value of total construction per capita during the 1939-47 period. The first two of the indices deal largely with quantitative growth. The next three depend largely on quantitative needs based on the individual's income, the degree of industrialization and the extent to which manufacturing facilities are kept modern.

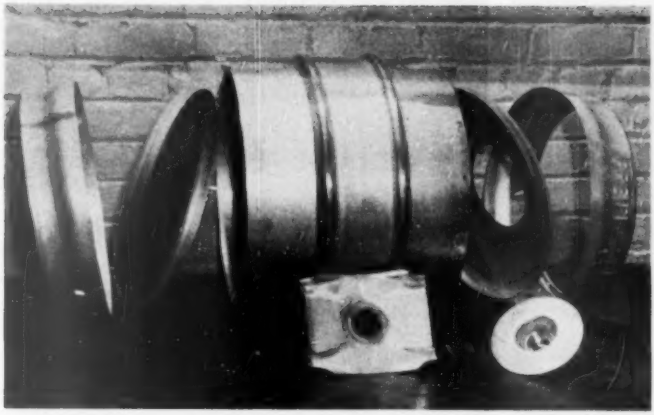
This study indicates that other parts of the country are rapidly gaining on the three Northeastern regions of the United States—today the most highly developed industrially. The tendency is towards a narrowing of the economic differential between the various regions.

Ever since 1939, the regions lagging behind the national standards of economic development have been clearly gaining in their race with the more highly developed areas. On the last three indices, the sections of the country west of the Mississippi have, in all cases, exceeded the regional rate of growth. New England, the oldest and most highly developed industrial area, failed to exceed the national average increase for any of the indices during the eight-year period. So did the Middle East. The best showing among the highly industrialized areas was made by the East North Central region, where two states exceeded the national rate of growth in three indices.

Texas and Utah were above the national average on all counts. Eleven other states, mostly in the West and Southwest, showed more favorable trends than the nation for four of the standard requirements. That the Western states are narrowing the economic differential between them and the Eastern states becomes clearly evident on the map.

The international situation clouds the future. The McGraw-Hill economics department report predicts, rather conservatively, that by 1960 the total national output of goods and service will be $315 billion (in purchasing power of 1950 dollars). Conditions are: (1) that we have no world war and (2) that ten years from now we will be enjoying the same sort of year of reasonably full employment that we are having in 1950. Population by 1960, says this report, will be 165 million, up 9%, and employment 65.5 million, up 5 million from today.

The 1960 national product output of $315,000,000,000 is projected on a growth of only about 1.7% per year over the decade. Welding, however, should do better. During the same period, the welding industry will probably grow at a rate of 5% a year. By 1960, then, welding should be well over a $500,000,000-a-year industry.



From these . . .

. . . to this

Stainless Beer Barrel

BY JACK I. MEDOFF

HOW TO DO a complicated job of inert-arc welding quickly and well is what you will learn from this article. It's a long way from the parts in the exploded view on the left to the finished beer barrel of shiny stainless steel on the right. The different operations are pictured on following pages

Photos courtesy of The Linde Air Products Co.

THE SANITATION, strength and corrosion resistance of stainless steel link up very well with the advantages of inert-arc welding in the manufacture of food and beverage containers. As an example, the Steel Cooperage Division of Industrial Stamping & Mfg. Co., Detroit, combines the alloy and the process to produce beer barrels. Welds are sound, smooth and clean, and there is no flux nor spatter to be removed.

What Parts Make a Barrel

Most of the parts that have to be joined are shown in the exploded view, top left illustration. From left to right are: bottom chime, bottom, body, top and top chime. In front of the body is the bung plate, into which is welded a bung ring. To the right of the bung plate is the tap plate, into which is welded a tap bushing.

The finished barrel (top, right illustration) is 17 11/16 in. in diameter and about 21 in. long, including the chimes or rims that protect the top and bottom.

First step in the manufacture is to roll the body from flat sheets of 16-gage type 304 stainless steel. The longitudinal seam is welded in the fixture shown in Fig. 1. Two such fixtures are used; the operator loads one while welding proceeds automatically on the other. A mechanized carriage moves the welding head along the joint at a speed of 24 rpm. The weld is made in less than a minute. The current setting is 150 amp, d-c straight polarity. Eight liters per minute of argon gas are consumed; 6 liters for welding and 2 liters for back-up purposes. The tungsten electrode is 3/32 in.

There are two stations for welding the top and bottom chimes. While the operator is loading one, welding automatically proceeds on the other. Like the body, the chimes are also formed of 16-gage type 304 stainless.

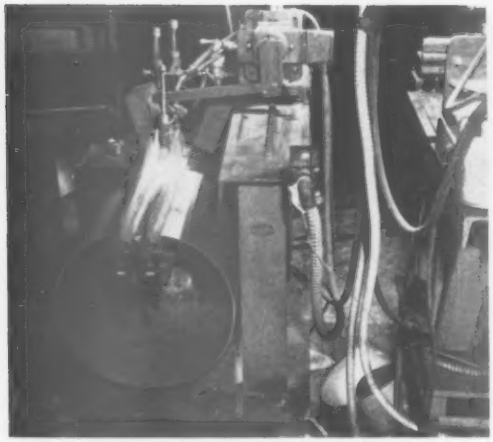
Barrel Takes a Bung

The next step is to make the bung plate. A bushing or a ring 2⅜ in. in diameter is welded to the stamped bung plate in a small fixture (Fig. 2). Hydrogen gas is burned beneath the plate during welding to protect the back of the weld from oxidation. A clamp holds the parts in line as they are turned under the torch to make the circular fillet weld that joins the ring to the plate. No filler metal has to be added. The weld is completed in 20 seconds. Argon flow is 6 liters per minute; current 160 amp, d-c straight polarity.

Simple fixtures specifically designed for each job are the secret of this manufacturer's production. One of these is used to locate and hold the bung plate within the body. Again, a hydrogen back-up fixture is used. The bung plate is lined up with a hole that was stamped in the sheet before it was rolled to make the body. When proper alignment has been secured, the operator welds all around the edges of the bung plate (Fig. 3); it's joined to the inside of the body in about a minute. No filler metal is added to make the fillet weld. Argon consumption is 6 liters per minute; current, 180 amp, d-c straight polarity.

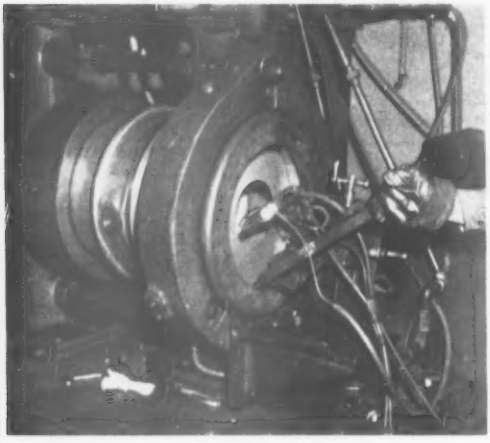
No grinding is needed because of the smoothness of inert-arc welds. There will be no pockets nor rough places to trap the contents and allow bacteria to breed. The smooth inside surface of the barrel makes it easy to clean and keep it in a thoroughly sanitary condition.

The ring previously welded to the bung plate must now be welded to the outside of the barrel. Here's how it's done. The barrel is clamped to a fixture (Fig. 4) so that the bung is on top. The operator holds the



1—BODY of barrel is automatically welded. Inert-arc torch is mounted on carriage, travels at 24 ipm

2—BUNG assembly is formed by welding a 2⅜-in.-diameter bushing (bung ring) to the stamped bung plate



5—CHIMES, top and bottom, are assembled to barrel in this fixture. The seams are welded from the inside

6—TAP PLATE (in operator's left hand) and the tap bushing must be joined before they go onto the barrel

Stainless steel becomes a beer barrel

inert-arc torch stationary as a motor rotates fixture and barrel in a horizontal plane. It takes about 20 seconds to make the small circular weld that joins the ring to the outside of the barrel. Again, no filler metal is added. Argon consumption is 6 liters per minute; current 160 amp, d-c straight polarity.

Adding Top and Bottom

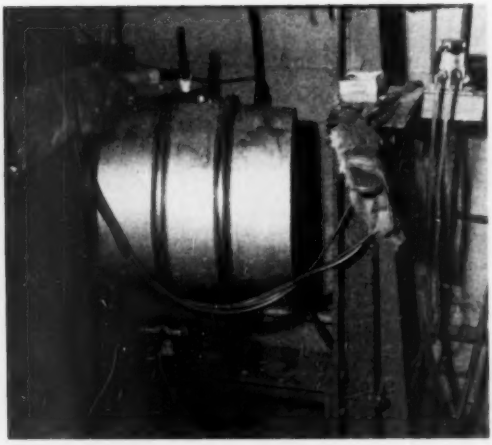
What we have now is a body with a bung; the barrel lacks both a bottom and a top. These and the top and bottom chimes are fitted and clamped to the body in still another fixture. The required circular seams are welded from the inside; the inert-arc torch is inserted through the tap opening in the top. Hydrogen gas is burned on the outside of the joint to protect the weld area from oxidation. After the top seam has been welded, the torch is inserted farther into the barrel and the bottom seam is welded in the same way.

Fig. 5 shows the turning jig and the torch-holding fixture for welding the body and the ends to the chimes. The barrel is in the fixture, and the operator is swinging the inert-arc torch into the barrel to make the inside weld at the top. With an extension arm, the torch can be inserted to the other end of the barrel to weld the bottom, bottom chime and body together.

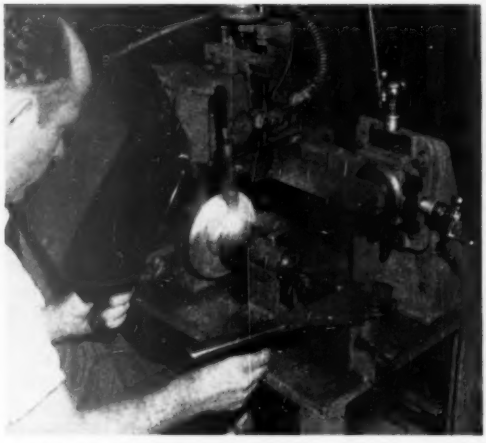
It takes about 1 min 45 sec to weld each circumferential seam. Welding speed is 30 ipm and argon flow 8 liters per minute. Current setting is 180 amp.

Before the tap plate is added, the barrel is tested by immersing it in

3—BUNG PLATE of the assembly in Fig. 2 is welded to the inside of the barrel's body. Note the fixture



4—BUNG RING is welded to the outside of the barrel. The turning jig rotates the barrel horizontally



7—TAP BUSHING is welded automatically to the tap plate in this fixture. Diameter at weld is 2⅛ in.

8—BARREL TOP receives the tap plate. Barrel, on a turntable, is rotated beneath the inert-arc torch

water and admitting compressed air at a pressure of 45 psi. Leaks show up immediately as a trail of bubbles. Two other pressure tests are made: one after the tap plate has been welded in and the other to assure the tightness of the completed barrel.

Tap Plate Comes Last

The tap plate is a circular flanged plate that must be welded to a heavy threaded bushing. In Fig. 6 the operator is holding the plate in his left hand and the bushing in his right hand. These two parts are clamped together and rotated for welding underneath a stationary inert-arc torch (Fig. 7). It takes 30 seconds per weld. The diameter at the weld is 2⅛ in. Argon flow is 6 liters per minute; current 160 amp, d-c straight polarity.

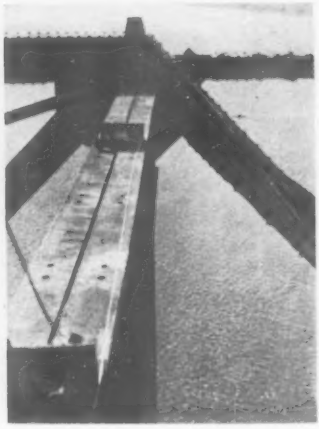
Final step in the manufacture is to weld the tap plate to the top of the barrel. The barrel is placed on a turntable (Fig. 8), and the tap plate is fitted into position. A slight shoulder (1/64 in.) prevents the tap plate from falling through into the barrel. The torch is clamped into position for automatic welding. The barrel is turned to make one complete revolution under the torch in about 55 seconds. Hydrogen is burned inside the barrel for weld back-up.

In this case, the tungsten electrode is 1/16 in. Current is 125 amp; speed 20 ipm.

Ready for Market

The barrel is given a second hydrostatic test after the tap plate has been added. It is then pickled, cleaned and thoroughly washed. Finally, the finished barrel receives its third hydrostatic test and is then ready to start a long and useful life of conveying one of man's most popular beverages to market.

FRED HOLT works astride one of the beams on the Snake river bridge



WORST BEAM of the Snake river bridge, Pasco, Wash., before (left) and after straightening. Beam is near the buckle in the upper chord of bridge

Bent Beams

Joseph Holt, of Seattle, has an out-of-the-ordinary business. Holt and his sons earn their living by flame-straightening bridges and other structures bent out of alignment. The trick is to know where to heat.

BY RAY BLOOMBERG

FOR MORE than 20 years, Joseph Holt, of Seattle, Wash., has been flame-straightening bridge members distorted by accidents. Holt, who describes himself as "the originator of distortion control," is almost invariably able to straighten the member in place without closing the bridge to traffic.

Holt's work is not confined to the straightening of bridge members. He has also used his flame-heating technique to straighten propeller shafts for ships, automobile crankshafts, drive shafts and drive shaft housings in autos and trucks, housings on truck rear axles, truck frames, truck bodies, "Snogo" augers, grader mould boards, grader frames, power shovel dipper sticks, shovel and crane booms, pipes of all kinds, fabricated members in structures out of line, steel castings warped in cooling, warped flue sheets and weldments improperly welded.

He once straightened the frame of a truck carrying a five-ton crane. The job was done in four hours without removing the crane. If Holt's method had not worked, the crane would have had to be removed and a new frame installed, requiring several weeks.

The Boeing Airplane Co. called upon Holt to straighten a balanced beam in its wind tunnel. Improper welding had thrown the beam out of line and it had to be straightened to permit the accurate reading of the instruments the beam supported. Boeing specified that the beam be straightened within 0.0004 in. Holt brought it back to 0.00005 in.

In one of his recent jobs, Holt straightened the supports for a whirly crane at the Todd shipyard in Seattle. A ship broke its tow line and hit the crane. One leg, made of 12 by 12 by $\frac{3}{4}$-in. H-beams, was folded for a distance of 6 ft. A horizontal channel 8 ft long was twisted 90 deg so that the flange was almost touching the web. Holt required only four days to straighten this badly beaten structure.

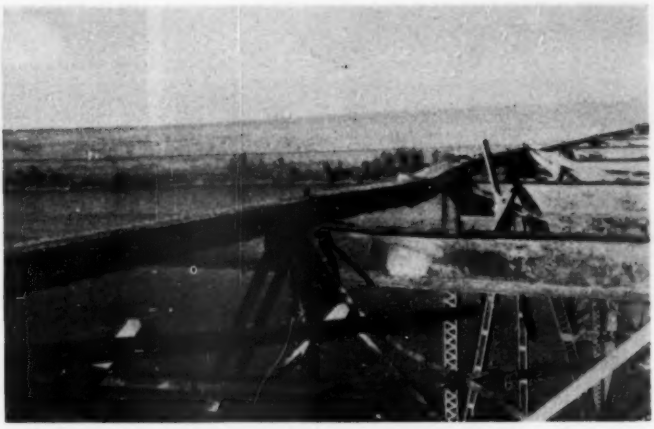
On bridges, Holt has straightened portals, batter posts, struts, laterals, verticals, wind braces and chords, without removing them from their original positions. His method is to work on several beams at a time, applying V-shaped "heats" to each beam in turn while the others cool. He applies heat to some 1,000 F (producing a light-red color) at the apex of the V, weaving the torch in ever broader strokes as he gradually progresses out toward the mouth of the V. There must, he cautions, be "metal cold enough, strong enough and so situated as to force the heated metal to upset unless some outside force can be added to force that upsetting action."

It's equally important to analyze the structure to determine whether the member is under tension or compression. "Untold damage can be done if these forces are not considered," warns Holt.

SNAKE RIVER BRIDGE JOB

Holt's largest recent bridge project was to realign 72 steel floor beams and two struts on a state highway bridge across the Snake river at Pasco, Wash. Fire had burnt away the timber deck and warped the steel work to such a degree that the structure was thought to be a total loss.

ONE OF the upper chords of the bridge, showing extent of buckle



OTHER UPPER CHORD of the Snake river bridge was likewise badly out of alignment. To restore the entire bridge cost the state less than $5,000

Brought Back

However, the bridge was on an important traffic route and no alternate route was available. The department resolved to attempt its restoration for one-way traffic until a new span could be constructed.

The I-beams were 28 in. high with a 10½-in. flange. They had warped in a fantastic manner. Some humped up in the middle; others took on compound curves. Upper flanges averaged 6 in. out of line and were otherwise deformed. Lower flanges were slightly deflected.

Holt and his son Fred were called in to straighten the beams and struts, a project that required 25 days and cost the state less than $5,000. Working 70 ft above the water and using only an oxyacetylene torch (usually with a No. 6 tip, 0.067-in. diam) they straightened beams as much as 8 in. out of line. Their only scaffolding consisted of three 12-in. planks with a light railing.

Father and son would work on four or five beams at a time, applying the V-shaped heats in the manner previously described. In each case, the mouth of the V faced the side of the beam that needed to be contracted. As the metal cooled, it would contract. Since the contraction was greatest at the mouth of the V, the beam would straighten in that direction, at the rate of about ⅛ in. for every foot of heated metal.

The heats were repeated until the beam was back in line. On the curves, these heats were about 1 ft apart. Occasionally, near the ends, where the beams had to be brought into a 180-deg angle from the upper chord, as many as four or five heats were made at the same location.

The average beam took about 20 heats; the minimum—where the beam was under no stress from the chords—four heats.

The beams had to be straightened to distribute the load equally on vertical members supported with piling driven in the river bed. The most difficult beams were nearest a 10-in. buckle in one of the upper chords, which was 16½-in. out of line in a 30-ft length. One beam was so near the point of balance that it moved ¼ in. the wrong way when Holt applied two small heats about the size of a quarter. To bring it back past the point of balance, he peened the beam on the opposite side until it moved back ⅛ in. past its original position, then applied heats until the beam was straight.

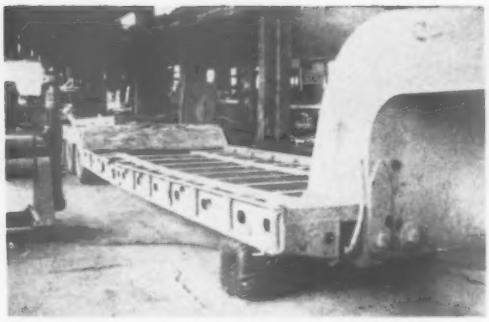
Engineers Study His Methods

The Engineering Experiment Station, University of Washington, has set up a project to study Holt's method of straightening structural steel. Preliminary tests at the university and also at Ohio State indicate that the heating in no way damages the metal. In some cases, elasticity of the realigned steel is reduced, but in all cases the straightened steel can carry more weight than it did before.

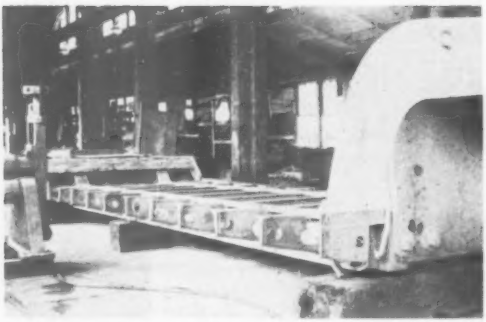
Says Prof. F. B. Farquharson, director of the University of Washington Engineering Experiment Station:

"Holt has demonstrated his ability to straighten bridge members through use of the oxyacetylene torch. By so doing, he has saved considerable sums of money in bridge maintenance and repair. From tests run here at the university and the fact that in no case has a straightened member failed in service, it appears that no serious damage is done to the member due to this straightening. In the interest of economy in bridge maintenance and repair throughout the nation, we feel that more research is expedient so that the principles involved in Holt's method may come into more general use."

Bridge batter posts, as their name implies, frequently take quite a beating, and Holt is often called upon to straighten them. One of the very worst was on the Pioneer bridge over the Cowlitz river between Long-



BEFORE view: trailer frame sagged 4½ in. because of improper direction of weld travel during manufacture



AFTER straightening: Holt reversed the stresses by torch heat; trailer sagged only ½ in. under 150% load

view, Wash., and Portland, Ore.; the post had been hit by a loaded concrete mixer. It was 20 in. across and 12 in. deep, consisting of two channels, back to back, with a ⅜-in. cover plate on top and lacing underneath. One knee brace was completely wrecked; 50% of the rivets holding the lacing bars were sheared off; the flanges were folded up and the web bent. The post was pushed into a diamond shape over a distance of 8 ft.

Without Holt's method, the bridge would have had to be closed for a month or more and the post replaced at a cost estimated upwards of $40,000. Holt took just six days, during which time the bridge was open to traffic, and charged the state just over $1,000.

Tests indicate the Holt method results in a 1 to 1½% loss in elongation but an increase in yield point, load and tensile strength.

"Steel contracts on cooling as much as it has expanded on being heated," Holt points out. "This is true of volume, but not necessarily of alignment or of length. That's why we can, by applying the heat in the proper way, straighten, bend or shorten the steel member to meet our needs."

Ordinary members of mild steel need no reinforcement during flame-straightening unless they are subjected to excessive stresses. Holt advises reinforcing, however, where heat-treated steel is to be realigned.

Excessive weight or stress on a member being heated must be relieved if it be of an amount sufficient to stretch the metal while it is hot. Where internal stresses exist, as in power shovel dipper-sticks, the first heat may only relieve these stresses and a second heat is required to do the pulling.

Truck Frame Bent Badly

Truck frames are often bent. Cause may be overloading, ruts in the road or collision. In one case handled by Holt, a truck was hit head-on while carrying a full load. Its frame was bent downward and sidewise, just back of the cab, so that the front end of the frame was 15 in. out of line on the vertical and 8 in. out of line on the horizontal plane.

After the truck had been stripped, Holt removed the two cross-members and heated them so as to bring them straight on the horizontal. One had to be heated on the flanges, starting at the web; the other, being bent the opposite way, on the web. To bring them back in line on the vertical, the top flange was left cold, the heat starting on the web next to it and widening out toward the bottom; the bottom flange was heated to the same width as the heat at the bottom of the web. Hammering was done only to flatten the web or flanges where they were kinked badly over short distances, and the hammer was used with as little heat as possible. The contraction caused by the heat was the only force used to pull the frame back to its proper alignment.

Holt was also called in to straighten a steel H 6 pile dolphin of the Port of Seattle. It had been hit by a large ship. The 10-in. piles, each about 70 ft long, had been sharply bent and were in some cases corkscrewed.

Before Holt was called in, an attempt was made to straighten the piles with a large trip hammer. The result wasn't good: the webs were buckled and a large number of waves showed up in each flange, demonstrating that the H sections had been stressed beyond their fatigue points.

Holt straightened the piles to the complete satisfaction of George Treadwell, Port engineer. The saving was 30% the cost of new piles.

Know Your Welding Terms

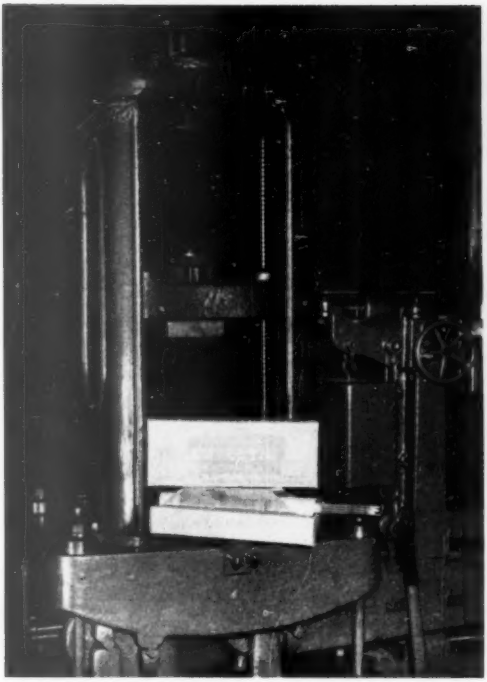
(From "Standard Welding Terms and Their Definitions," AWS, 1949)

Reaction Stress: The residual stress which could not otherwise exist if the members or parts being welded were isolated as free bodies without connection to other parts of the structure.

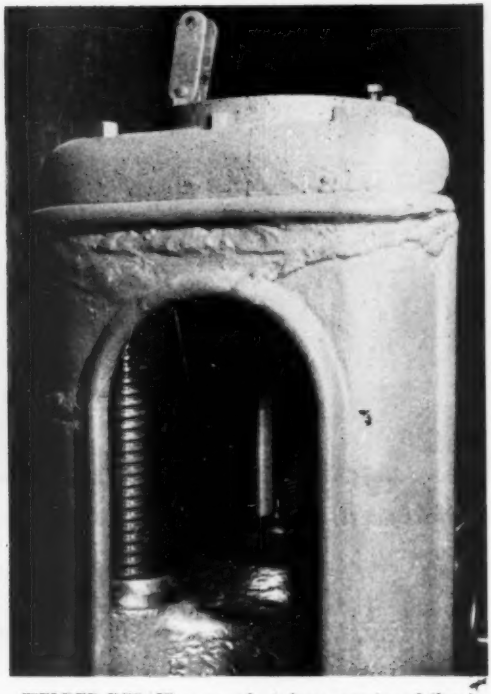
Selective Block Sequence: A block sequence wherein successive blocks are completed in a certain order selected to create a predetermined stress pattern.

Transverse Seam Welding: The making of a seam weld in a direction essentially at right angles to the throat depth of a seam welding machine.

Forge-Delay Time: In spot and projection welding, the time between the beginning of weld time, or weld interval, and the time when the electrode force first reaches the specified pressure for forging.



HEAD OF 100,000-psi testing machine broke off, interrupting war work. Problem was how to repair it



WELDED REPAIR was made (after a previous failure) with low-temperature welding electrodes. It took 4 hr

Low Heat Avoids Stresses

ONE of the leading technical institutes in the country has been actively participating in vital military work. Instrumental in performing such work is a 100,000-psi testing machine. When the machine was inadvertently overloaded, its head broke off the side members.

Due to the nature of the work engaged in, immediate repair was imperative; a replacement would have been expensive and would have involved considerable delay. The machine was at once dismantled and prepared for gas welding.

The job was performed by an expert weldor, with a commercially accepted rod and using a time-honored procedure. The entire casting was oven-preheated for 12 hours, then welded, buried under lime and finally allowed to cool slowly for a span of 48 hours. Three days were consumed by this welding operation. The weld should have been all right, but it wasn't.

On the first day after this repair, the casting again cracked wide open, through and alongside the weld area.

Investigation revealed these facts: The heat of fusion welding left residual stresses in the casting. The first time the machine was subjected to a heavy load, the underlying stresses erupted, causing breaks and cracks throughout the weld area. These internal stresses may lie dormant, perhaps never manifest themselves in cracking or breaking, if the casting is not later subjected to load. The tensile testing machine, however, provides a perfect example of the prime disadvantage of conventional fusion welding in the repair of heavily loaded castings.

Officials of the institute decided to do the job all over again by the arc process, using low-temperature electrodes.

First, the breaks were beveled with a metal-arc cutting electrode. This left just sufficient heat around the weld area to facilitate welding immediately after beveling.

The broken parts of the machine were quickly aligned, and no further preheat was used. The low-heat electrode selected is one said to give a bond of 60,000 psi on cast iron without deep fusion of the metal. The breaks were first tack welded; then stringer beads were deposited. A low amperage was used to avoid overheating of the casting. Additional beads were run with the arc played on the weld metal to avoid possible fusion or puddling of the cast iron. The job was completed in four hours.

There was no distortion, as evidenced by the fact that upon reassembly the bolt holes lined up perfectly and the dowel pins slipped back into position without difficulty. At the present writing, the machine has been back in service for nearly six months without further trouble.

Photos from Eutectic Welding Alloys Corp., courtesy of Case Institute of Technology, Cleveland.

O L D

1—WHITE-LETTERED SIGNS, a once familiar landmark of the Windy City, have disappeared from its downtown streets

Chicago's New

Here's the story behind the yellow-and-black signs now popping up at Chicago intersections. Studs offer a neat way of fastening weatherproof signs to poles.

Courtesy Nelson Stud Welding

3—END-WELDING stainless studs to pole. Sign fits onto two studs

FERTILE source of headaches among officials of almost any large city is the simple street sign. The problem is how are you going to keep 'em in place on the poles? The commonly used straps or bands are high in maintenance costs as corrosion takes place under the strap, where painting is not practicable. The cost of new straps, particularly stainless straps with stainless fasteners, is quite high. So what's the city going to do when the old signs start rusting away from the poles?

One natural answer appears to be the stud welder. The advantages of attaching signs by stud welding are:

1. Corrosion points set up by "wrap-around" bands are eliminated.
2. Maintenance costs are reduced.
3. Once the studs are welded in place, the signs go up easily.

CHICAGO NOT CONFIDENTIAL

Now let's look at Chicago, where the largest single street-sign project of all times is under way—67,000 acid-resistant, self-cleansing porcelain-enameled signs. If your impression of Chicago is derived from the newspapers and from sensational books such as *Chicago Confidential*, you might believe that such a project offers a swell chance for graft. Guess again. Some of the city's public officials, believe it or not, are actively interested in saving the taxpayers' money. Among them, very definitely, is Ralph Michel, associate traffic engineer of the bureau of street traffic.

Michel has shared responsibility for the development of the city's excellent traffic control signal system and many other traffic matters during his 28 years with the department. The problem of the new street signs was thrust in his lap. Michel couldn't find a satisfactory answer in any of the 50-odd types of signs on the market. He got interested and started to work nights. Before long his basement workshop began to look like a museum collection of street signs. He had gathered samples of practically every type.

Trying out one sign after another for more than six months, Michel finally threw them all away and worked out his own design. He has applied for a patent on it; meanwhile, the City of Chicago is licensed

N E W

Courtesy Nelson Stud Welding Div., Morton Gregory Corp.

2—L. M. JOHNSON, commissioner of street and electricity, places the first of 25,000 new Chicago street-name signs

Welded Street Signs

to use the design without cost. It's going to save taxpayers a considerable amount. When the city started out sign shopping two years ago, the lowest acceptable bid was $7.65 per sign; Michel-designed signs will cost $1.67. The latter figure is the bid offered and accepted for the first 25,000 signs. Bettinger Enamel Corp., of Waltham, Mass., was the lowest of 11 bidders; the other bids ran from $2.25 to $4.65 per sign. Smaller cities, Michel estimates, might be able to buy smaller quantities of signs for around $3.50 per sign.

Old Signs and New

The old signs (see Fig. 1) have names with white letters against a dark background. A fairly common type is a shallow channel with a row of holes drilled in each flange. Flanges are on the same side (U-design). Two such signs (one for each of a pair of intersecting streets) are bolted together at right angles and are fastened to the pole by means of two pairs of flat steel straps. One end of each strap is attached to a cast fastener that's bolted to the sign; the other end terminates in a similar fastener for bolting to the opposite strap. When the mating fasteners are bolted together, both pairs of straps encircle the pole to hold the signs in place. Straps, fasteners and bolts afford wonderful opportunities for rust.

The new signs (Fig. 2) have large black letters, 4½ in. high, against a yellow background. The sign is a relatively heavy (14-gage) sheet and is flanged oppositely at top and bottom (Z-design). Such construction gives it greater rigidity and structural strength. The flanges are not drilled for bolts, as in the old sign. Mounting is by means of a channel, formed of 12-gage stock and subsequently rustproofed by black enamel. One end of the sign is inert-arc welded to this channel. On the channel, above and below the sign, are ⅜-in. holes for the insertion of ¼-in. threaded stainless-steel studs, 1¼ in. long. There are no straps nor cast fasteners to rust; there is nothing that is not enameled except the stainless studs and the stainless nuts and stainless washers that hold the sign in place.

Mounting to Poles

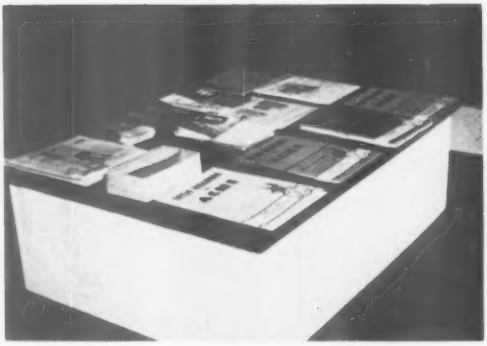
The studs are end-welded to steel poles very quickly and cheaply by means of the arc stud-welding gun (Fig. 3). In the Loop, where the installation started, the first thousand of the new signs were all bolted to steel poles by means of welded studs. This fast, economical method of installation provides a permanent anchorage for the signs. So strong is the welding (both welding of studs to pole and welding of end of sign to mounting channel) that the outer end of the sign is able to support a weight of 440 lb.

Unfortunately, all poles available for the mounting of street signs are not made of steel. Some may be bronze, cast iron and perhaps concrete. With poles of such materials, there is no alternative to banding. The new signs take care of this contingency by providing slots on the sides of the mounting channel for the bands that encircle the pole.

As delivered, each of the new signs is in one piece: there is nothing to assemble. It will be easy, says Michel, to keep the cantilever-anchored signs clean; in fact they will probably clean themselves in this abnormally rainy town. Sign replacement, Michel estimates, will be required only about every 50 years.

A vast improvement over the old system. And a very neat idea, made possible by welding.

HOFFMAN HANDLES complete lines of r-w electrodes. Tips above were made to company's own specifications



MANUFACTURERS' LITERATURE occupies prominent spot on a table at front of the company's new showroom

Resistance-

Robert W. Hoffman Co., Inc., relies on direct selling, including careful analyses of customers' welding problems. Showroom displays and demonstrations also help to build business in resistance welders and abrasives.

BY CLYDE B. CLASON

YOU HAVE read articles in THE WELDING ENGINEER about distributors of welding gases and oxyacetylene equipment and other articles about distributors who specialize in arc-welding equipment. But the operations of Robert W. Hoffman Co., Inc., fall into neither category. This Chicago distributor sells no gases, torches nor arc welders but specializes primarily in resistance welders. And is doing well, thank you.

SERVES GREATER CHICAGO

The mainspring and spark plug of the organization are two aggressive men; namely, Robert H. Hoffman and P. Arthur Green. The former is president and treasurer; the latter secretary of the firm. The "Hoffman-Chicago" territory is primarily "Greater Chicago," which takes in a two hundred mile radius of the city. The company is centrally located in a new office and showroom within easy walking distance of two main railroad stations and right in the heart of the district known to Chicagoans as "machinery lane."

In his advertising, Hoffman refers to his organization as "abrasive and welding engineers." Abrasives, at present, are the smaller part of the business, but it can indeed be said they were the cornerstone upon which the original business was laid.

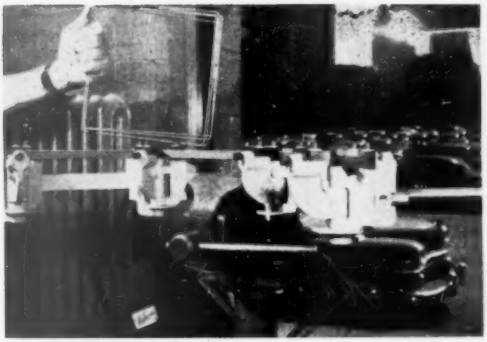
The company was founded in 1916 by Hoffman's father, the late Robert W. Hoffman, who had been district manager for a large manufacturer of grinding wheels. The elder Hoffman foresaw an excellent opportunity to establish his own business as sales agent for all types of abrasive products. The company's first address was at 15-17 S. Clinton St.—just across the street from where it is located today.

As a side line to abrasives, the senior Hoffman added resistance welders—then a little known product. The abrasive business prospered from the first, but the sale of resistance welders was slow. The process did not become really popular with sheet-metal fabricators until around 1940. It was not until then that the elder Hoffman began to cash in on the prestige that he had slowly built up by years of arduous pioneering. Just before the war, however, he took on two new lines of resistance welders and really got going.

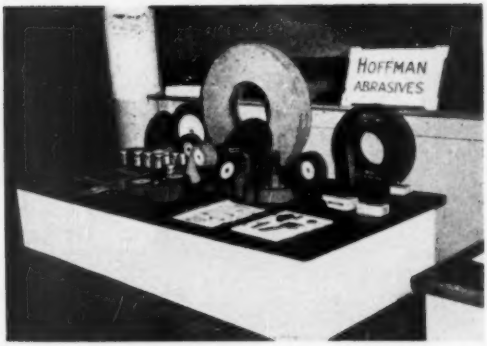
Oddly enough, sales slumped during the war years. There were plenty of big r-w installations sold during the war, says the company's present president, but not so many small spot welders. The demand for these started upward when peacetime industry resumed.

Of Hoffman's volume today, about 70% is from resistance welders and 30% from abrasives. The company is a manufacturer as well as a distributor. In 1947 it developed the "Butt-on-spot" attachment that converts a spot welder (almost any make) into a light-duty butt welder for wires and similar work. The latest Hoffman product is the "Weld-Air-Matic" for the conversion of foot-operated spot welders to air-operated automatic operation. This promises to vie in popularity with the "Butt-on-spot."

The company handles spot welders in capacities of from 5 to 200 kva, portable welding guns, butt welders, flash welders, seam welders, projection welders, multiple-electrode welders and stud-welding equipment. With the exception of standard spot welders that can be sold from stock, most of the above products are tailor-made for particular jobs. The company also handles complete lines of resistance-welding electrodes, tips, adaptors and dies. Again, the Hoffman ingenuity is shown in the "Hex-eez-out" tips, made to the company's own specifications. Conventional re-



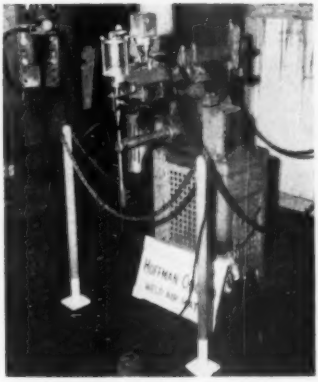
PORTABLE WIRE BENDER was found on display. It will produce perfect squares, rectangles or hexagons



ABRASIVES HAVE long been a Hoffman specialty. The company handles all sizes, shapes and bonds of wheels

Welding Distributor

BOB HOFFMAN (at right) shows a portable welding gun to a customer



NEAT SIGNS give tabloid information on products in the showroom

ART GREEN demonstrates the use of new equipment for stud welding

sistance-welding tips are round and must be removed with a pipe wrench. "Hex" tips are hexagonal, as the name implies, and can be removed by any type of wrench without "chewing up" the tip and with minimum danger of cracks. They are offered for gun welders and spot welders that do not use ejector-type holders.

Abrasive and Other Products

The company sells all types of resistance-welding controls—electronic, pneumatic and magnetic. On the abrasive end of the business, it serves as a distributor for three major manufacturers. Hoffman handles all sizes, shapes and bonds of grinding wheels, mounted points and abrasive bricks; also handles abrasive belts, grinding-wheel dressers, bench grinders from ¼ to 30 hp, portable grinders both pneumatic and electric. Among the newest products to be added is a portable wire bender that will produce perfect squares, triangles, rectangles or hexagons with a simple hand operation. Frames thus formed are finished by butt welding the ends of the wires together.

To complete its operation, Hoffman sells rebuilt resistance-welding equipment and offers a full repair service for customers' out-of-order welders.

"Do the same customers buy abrasives and resistance welders?" the interviewer wanted to know. Hoffman's answer was No. Since they are resistance welder distributors, they do not reach the arc-welding market for grinding equipment. The bulk of the grinding-wheel business comes from foundries and forge shops, whereas welding customers are largely fabricators of sheet metals and wire.

A word about the people in the

In the service department . . .

CHARLES ALLEN tests a new special welder of the "poke gun" (single-electrode) type. Note ground clamp

ARNOLD MATOUSEK tears down an old welder to find the trouble. All makes of welders are repaired

organization and the part they play is in order.

R. H. Hoffman has been president and treasurer since the death of his father in November, 1945. Bob, as he would prefer being called, keeps the administrative and sales end of the business clicking.

Corrine V. Hoffman (Mrs. R. W.) is vice-president and, although not too active, has a definite stabilizing influence on the firm.

P. Arthur Green is secretary. Art's responsibilities lie primarily in welder application engineering and the manufacturing and service end of the business.

D. Tiffany is sales manager of the abrasive division. E. M. Greenleaf is sales manager of the welding division; Lloyd Talbot is welder sales engineer, and inside sales on both welders and abrasives are handled by Robert Mariacher, office manager.

The repair department and manufacturing end of the business employs four full-time machinists: Bob Walker, James McCarthy, Charles Allen and Arnold Matousek. These capable mechanics can completely rebuild welders, convert welders from manual to air operation, make special welders, repair all makes of welders and welder controls, design and build projection-welding dies, special fixtures and electrodes.

In its repair shop, the company has ample power available for testing and demonstrating welders and welding customers' samples. The sales engineers spend a great deal of their time in analyzing customers' problems and working out solutions; this could not be done without a practical resistance-welding laboratory to use.

Because of its comparatively small personnel, the company is able to operate in an informal way that would probably not work in larger organizations. For instance, there are no restricted territories; each man is allowed to play the field. This does not result in any friction; each man has his own customers and new business belongs, theoretically, to whoever can bring it in.

Good Showroom

The company's sales efforts are supplemented by some direct-mail advertising: manufacturers' literature and special announcements are sent to a list of over 1,000 names. A more important business getter, however, is the new showroom.

One of his best assets, thinks Hoffman, is the company's good location. Last March the company moved into a building that gave it 5,000 sq ft of floor space. This building, at 32 S. Clinton St., is less than a block from the North Western railroad station and within two blocks of the Union station—the Pennsylvania, Chicago & Alton, Milwaukee, Burlington, Chicago & North Western and Union Pacific lines are all at its very door. Naturally, out-of-town customers can easily drop in between trains or on their way back to the station—and naturally they do.

For those who prefer to come in their own automobiles, a large parking lot is located immediately across the street. The Hoffman company is not more than 15 minutes' walk from the Loop and is easy to get to.

Shortly after moving into its new quarters, the company held a two-day open house. The management conceived the idea of lettering simple signs or cards to describe particular lines or products. These signs are still in service and have proved very popular with walk-in customers, who can stroll about the room and read for themselves just what is being shown. This idea has been used by other welding distributors but not by enough of them. It costs comparatively little.

Another good idea is a special table of manufacturers' literature, from which customers may help themselves. The showroom is featured by a 1-ton crane, used to move heavy equipment around and to display gun welders. Gun welders, says Hoffman, don't look like much unless they are up in the air, where they are meant to be used. Both air and power are available in the showroom for actual demonstrations of equipment up to 75 kva.

It is hard to estimate the dollar-and-cents value of walk-in business, but Hoffman considers it tremendously important. The showroom not only attracts new customers but helps to cement better relations with old customers. It is, perhaps, highly significant that since the company moved to its new location on March 1, its sales of welding equipment have increased by about 40% and sales of abrasives have gone up about 20%.

PAGE *Welding* ELECTRODES

Page-Allegheny *Stainless Steel*

AC or DC

ARC
—stable even at very low amperage

SLAG
—clean, easily removed

COATING
—resists cracking down to very short stubs

SELECTION
—complete line for welding every type of stainless

DELIVERY
—prompt from warehouses in Chicago, Denver, Houston, Philadelphia, San Francisco and the factory at Monessen, Pa.

ACCO

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

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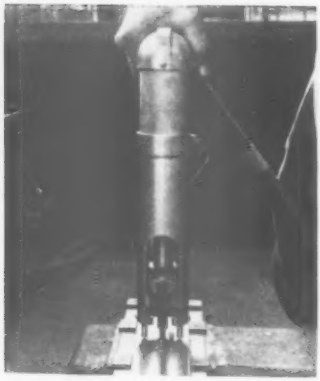


New Cyc-Arc Stud Welders Have Many Improvements

SEVERAL NEW REFINEMENTS have been announced in Cyc-Arc stud-welding guns. One, the Type D gun for hand operation, can be used in all positions. All moving parts are contained within a cylindrical steel body, to which is fixed a pistol-type handle. Current and control cables enter through the handle. Studs may be used up to 4 in. long and (with varying control set-ups) from ⅛ to ⅞ in. in diameter. Three short legs of hardened steel position and hold the gun for accurate placement of the studs. There is also automatic self-adjusting compensation for variations in stud lengths and/or plate unevenness up to about 1 in. An air dashpot controls the speeds at which studs are put on the plate. Weight of the gun with cables is 22 lb and overall length 10 in.

The Type F head for production welding is designed for high rates of fabrication of subassemblies. This head welds studs of from ⅛ to ⅞ in. diameter within tolerances of ±0.006 on location and ±0.01 in. on height if proper jigging is provided. It is actuated hydraulically by a solenoid-operated cylinder. It is self-adjusting to maintain the correct arc length for variations of plus or minus ¼ in. in stud length and/or plate surface. All moving parts are totally enclosed by a light gauge sheet-steel cover over the main body. The Type F head can be used with a Type A20P or Type E1 controller.

A complete stud welder, the Type E1-FM, consists of the Type F head and the E1 controller incorporated in a compact cabinet occupying 3¾ sq ft of floor space. The welding head is fixed to a bracket that is free to move vertically on the vee-slides of an extensible horizontal arm. The arm is mounted on the top of a vertically moving column, adjustable and moved by a rack and pinion. A hand lever-operated spindle moves the welding head. The weld switch may be arranged for a foot or hand operation. All welding and control cables are carried inside horizontal and vertical tube members to protect them against damage. The welder is approximately 3 ft high, with table dimensions of 1½ by 2 ft.

CYC-ARC LTD., Stelmar House, 27 New North Rd., London, N 1, England.

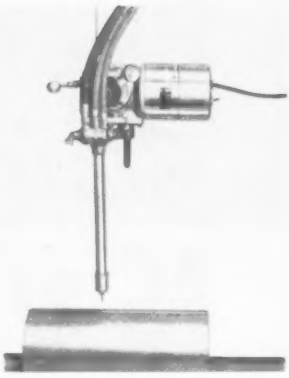
* * *

New Portable Tester Gives Hardness Readings

A NEW DIRECT-READING hardness tester is a portable instrument that gives Rockwell readings or, if needed, Brinell, Diamond Pyramid or Tons Tensile readings. The operator merely presses down on hand-grips so that the point penetrates into the surface of the material being tested. The point is under a load of 15½ lb, kept constant by a calibrated helical spring. The microscopically small movement of the indentor is magnified about 3,000 times by the displacement of liquid into a capillary tube that encircles the hardness scale.

The reading on the scale can be adjusted to allow for atmospheric variations. The instrument can be used on curved surfaces provided the radius of curvature is not less than 3/32 in. It weighs only 30 oz and can be packed in a case 6 by 3¾ by 3½ in.

NEWAGE INTERNATIONAL, INC., 521 Fifth Ave., New York City.



New Brazing Method Drips Alloy onto Seam

A NEW METHOD of drop or drip brazing has been developed for production systems where conveyor lines are used. The brazing wire is fed into a gun and there melted in a natural gas-oxygen flame so that it falls in small drops onto the seam. Speed of the wire feed is controlled (by a constant-speed induction motor in the gun) to synchronize with the speed of the conveyor line carrying the work. As a rule, the gun is stationed over the conveyor so that the work will move under it. The end of the brazing tip is about 1¼ in. from the work surface. Usual speed of brazing is from 60 to 120 lineal ipm.

Sometimes it is necessary to use a small preheating flame. This impinges on the work an inch or so ahead of the brazing flame.

The same method has been used for lead-base soldering on a production basis. Savings of solder are said to be as high as 75%.

METALLIZING COMPANY OF AMERICA, 3520 West Carrol Ave., Chicago 24.

* * *

Special Tempil Pellets for Reducing Atmospheres

SINCE many modern heating and brazing applications require a hydrogen, cracked ammonia or producer gas atmosphere, Tempil Corp. has a new special line of Tempil pellets that resist the reducing effects in such furnaces.

TEMPIL CORP., 132 West 22nd St., New York City 11.

for welding

Three stud welding developments, a hand gun, a control unit and specially-built power suppliers, feature October's new products. Glance at a ten-gun spot welder, a chair-leg welder and a new grinder

Control Unit Offered for Inert-Arc Stud Welding

A NEW CONTROL unit is believed to be the only one in this country specifically designed for the inert-arc welding of aluminum or stainless steel studs to similar base metals. It provides electronic timing control of the weld period and also automatic (pneumatic) timing control of the inert gas flow before and after the weld.

Though portable, the control unit is ruggedly built to withstand heavy industrial service. Its calibrated adjustment dials are mounted on a dead-front panel to protect the operator from the chance of shock when he makes adjustments. Rigidly mounted fittings provide connections for arc welder and stud gun, inlet and outlet gas hose, control cable and 110-volt power supply. A solenoid valve is incorporated for the control of the inert gas. Contactor is of the high-speed magnetic type, designed for frequent short-timing periods and heavy loads.

SHIELDED STUD WELDING CO., 124 W. 4th St., Los Angeles 13.

* * *

Liquid Stops Fogging for Three Weeks

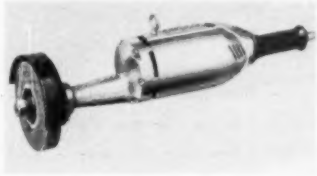
"FOG-GONE," a new compound for welding lenses, safety goggles, welding helmets, auto wind-shields, etc., is claimed to prevent fogging for periods as long as three weeks. It has a petroleum-derivative base and also contains silicones. It has no alcohol or glycerin. "Fog-gone" is packaged in a 4 oz. plastic "squeeze-spray" bottle. For industrial use, it comes in gallon and half-gallon sizes with separate plastic bottle dispenser.

MASTER, 4444 Brooklyn Ave., Los Angeles 22.

* * *

6-in. Portable Grinder Has Suspension Eye Bolt

TO LESSEN worker fatigue, a new continuous grinder, Model 142, has an eye bolt from which it may be suspended to relieve the operator of its weight. The grinder is recommended for grinding down weld



beads, castings, wire brushing, buffing or polishing. It has a molded plastic rear handle and an a-c/d-c motor with a no-load speed of 3,800 rpm. Length is 23½ in.; weight 19½ lb. The tool has the good balance necessary for continuous operation, says its manufacturer.

SKILSAW, INC., 5033 Elston Ave., Chicago 30.

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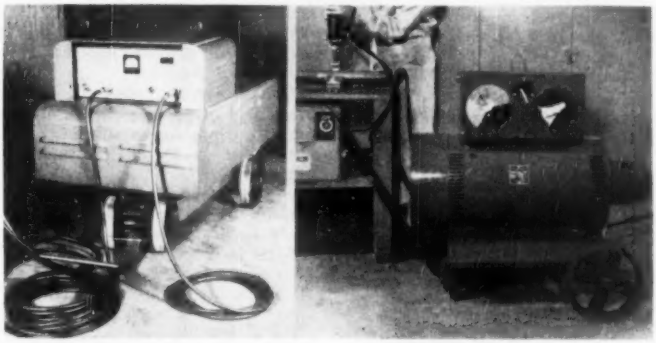


BATTERY SUPPLY AND D-C welding generator built for Nelson stud welding guns. Battery-operated unit has twelve 150-amp batteries. Generator is same size as 200-amp welder

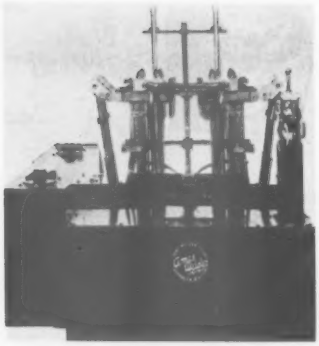
Nelson Builds Its Own Stud-Welding Generators

TWO SPECIAL current-supply units—a motor-driven d-c generator and a battery supply—are announced for use with Nelson stud-welding guns. The motor-driven generator supplies a current of up to 600 amp; it is said to be particularly effective for welding large studs in sizes from ½ to ¾ in. diameter. The battery package includes twelve 150-amp wet-storage batteries, mounted on a strong frame and covered with a metal hood. There is an automatic battery charger on the hood, and wheels are available as optional equipment.

The motor-generator unit, claims Nelson, is equivalent to two conventional 400-amp welders in parallel, although its cost is about ⅓ less than two such welders. It is the same size as a 200-amp welder and weighs about 700 lb. Power supply for the motor can be either 220 or 440 volt 60 cycle a-c.

The battery package will be able to handle studs up to ½ in. in diameter. It weighs 1,100 lb and is useful for construction or maintenance jobs where other power is not available.

NELSON STUD WELDING DIVISION, MORTON GREGORY CORP., Lorain, O.



Welder Joins Chrome Tubes without Burning Chrome

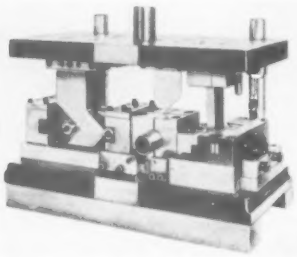
NEW RESISTANCE welder joins three pieces of bent chromeplated tubing in a single operation. The chrome is not burned, the welder manufacturer claims, and the spot is hardly noticeable. The tubing is welded into dinette chairs.

Capacity of the machine is 90 to 150 chairs per hour. Former method of joining chair frames was to arc weld them in a jig having four clamps. After arc welding, it was necessary to clean the splatter and paint the weld with aluminum paint.

Welding current is on for ½ second in two sequences. Maker claims that about 12 chairs can be welded for a penny's worth of electric current.

AMES SPOT WELDER CO., INC., 1328 58th St., Brooklyn.

* * *



Punch Press Attachment Cuts Off Tubing

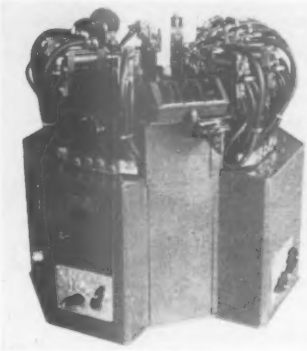
THE new Vogel tube cut-off machine fits into your power punch press to cut tubing up to 3-in. OD to accurate lengths. There is said to be little burr or distortion on the tube edges.

Interchangeable dies allow change from one tubing size to another within the range of the particular machine. It may be operated manually or with an automatic stop. Cutting blades are sharp after thousands of cuts, says the company.

Various models are available for different diameters: Model No. 12 cuts tubing up to ½-in. OD; Model No. 2 handles up to 2-in. OD and Model No. 3 up to 3-in. OD. All models include blades, dies, clamps, die inserts, etc.

VOGEL TOOL AND DIE CORP., 2527 Moffat St., Chicago 47.

* * *



Ten Gun Welder Makes 520 Units per Hour

THE Sciaky MG-5 welder produces 520 household mixer base units per hour by utilizing ten self-centering welding guns and five welding transformers. An electronic control cabinet is mounted separately and has a control sequence of squeeze-weld, hold and off times.

Components for the mixer base are placed in position by the operator. By depressing a single control button, he starts all ten welding cycles. By simple adjustments of locating fixtures and welding guns, various size and shape bases can easily be loaded and welded.

SCIAKY BROTHERS, INC., 4915 West 67th St., Chicago 38.

* * *

New Electrode Holder

MULTI-LAYER laminated glass cloth insulates the tip and sleeve of the new "Eureka" electrode holder. Collar is insulated by bakelite molded square to prevent rolling. Neoprene rubber insulates the trigger. For holding electrodes from 3/32 to 5/16 in. in diameter, it comes in two models, the 4-S for soldered connection and the 4-R for quick removable connection.

THE FIBRE-METAL PRODUCTS CO., Chester, Pa.

Non-Fogging Cleaner for Welding Lenses

"NO-FOG" GLASS CLEANER and "No-Fog" liquid clean welding lenses and prevent fogging and steaming afterwards. They are easily applied. Both fluids are simply wiped on and wiped off to leave a clear surface.

THE CARHOFF CO., 9321 Buckeye Road, Cleveland.

* * *

Aluminum Brazing Rod Melts at 732 F

THE new "Genie" aluminum brazing rod for repair and fabrication of sheet aluminum is claimed to have a melting point of 732 F.

The surface to be repaired should be brushed thoroughly under torch heat to thoroughly break up the aluminum oxide.

The parent metal is then heated until it melts the end of the rod without the aid of the torch flame—the surface is tinned in this manner. Using the brush again, the tinned surface is thoroughly gone over to fill the surface holes and cracks. After the sides are completely tinned, the rod is flowed in to fill the joint.

ALADDIN ROD MFG. CO., 1300 Burton St., S. E., Grand Rapids 7, Mich.

* * *

NEW PRODUCTS BRIEFS

Automatic emergency light operates with battery charged by 110-volt house circuit. The "Energi-Lite" is plugged into a house circuit with battery "on." If power failure occurs, battery keeps light burning for 9 hours. When power returns, battery automatically recharges. ALLIANCE ELECTRIC WORKS, LTD., 141 Bates Rd., Montreal 8.

* * *

For stamping round or curved metal parts, the PF-20 periphery stamping fixture uses straight body type for curved marking. The type characters have a retaining feature that does away with retaining pins and slotted type. M. E. CUNNINGHAM Co., 39 East Carson St., Pittsburgh 19.

* * *

"Load King," a new Yale hand chain hoist, made by the Philadelphia Div., THE YALE & TOWNE MFG. Co., is said to have 95% efficiency. A man can lift a 1,000-lb. load with less work than it takes to climb a flight of stairs, claims manufacturer. A full ½-ton load can be raised three feet in 20 seconds.

* * *

(Continued on page 105)

The Hard-Working Operator Deserves This Easy-Working Torch

Available with complete line of tips for all commercial fuel gases—75°, 90°, and 180° heads—top or bottom liner—special lengths.

TO the hard-working man who spends long hours every day doing real things with a gas welding or cutting torch, the quality in every part of a K-G Torch counts for something. For K-G makes no compromise with quality. We use only tested design and materials that insure easy operation and prevent wear and breakage.

The net result is a torch that the operator can handle with confidence and skill and with a minimum of effort and fatigue. K-G Torches are noted for compactness, light weight, correct balance, accurate control and all-'round easier handling.

The M-38 Cutting Torch illustrated here features Monel head, non-flashback tip, nickel-silver tubes, non-galling Tobin bronze needle valve seats, precision control high pressure lever, easy grip handle, large and properly spaced needle valve handles. This is the kind of torch that brings out the best skills in an operator.

Buy an M-38 from your distributor and see for yourself.

K-G

WELDING AND CUTTING COMPANY, Inc.

515 West 29th St., New York 1, N. Y.

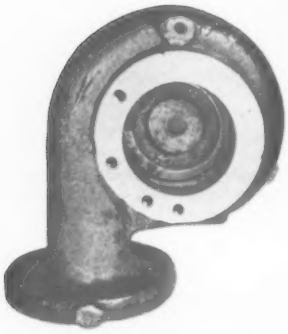
Sold in Canada under the name "WELDCO"
by Welding and Supplies Co., Ltd., Montreal and Toronto

A UNIT OF Air Products INC. OXYGEN GENERATING EQUIPMENT

K-G ... for 35 years, symbol of satisfaction on GAS WELDING AND CUTTING EQUIPMENT

Rewarding work!

NI-ROD saves iron castings . . . makes *machinable* welds



But for Ni-Rod electrodes, this pump body would have been scrapped at the foundry. The built-up area of the flange facing is almost indistinguishable from the original cast iron. Machining, drilling and tapping of the Ni-Rod weld deposit were no more difficult than similar operations in cast iron.

In the photograph above, you see a 45-pound gray iron pump casing that was rejected because a small area of the flange failed to fill during pouring.

Instead of being scrapped, the casting was sent to the plant's welding department. There, with Ni-Rod® electrodes, the defective flange was built up and the repaired casting was passed to the machine shop where it was finished like a regular production piece.

Salvage operations like this with Ni-Rod save time and money.

Ni-Rod gives fast, crack-free, non-porous welds that are a close color match for gray iron . . . and welds that are as *machinable* as the iron itself. Slag removal is easy. And Ni-Rod is stable-arcing in all positions with either AC or DC current.

Another important Ni-Rod feature . . . preheating or post-heating is seldom necessary.

Why not try Ni-Rod in your own shop . . . soon? Discover for yourself why *4 out of 5 shops* re-order Ni-Rod, once they've tried it.

Your nearest INCO distributor stocks Ni-Rod in 3/32", 1/8", 5/32", and 3/16" diameters.

For welds you've never been able to make before . . . in high-phosphorus irons; heavy sections—

NI-ROD "55"

FREE – 8-page booklet:
"NI-ROD . . . a new electrode for any cast iron welding."

THE INTERNATIONAL NICKEL COMPANY, INC.
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Eagle Metals Company	Pacific Metals Company, Ltd.	Wilkinson Company, Ltd.
Metal Goods Corporation	Steel Sales Corporation	Williams and Company
Metal & Thermit Corporation	**National Cylinder Gas Company**	**Hollup Corporation**

Areas of Rings

BY W. F. SCHAPHORST, M.E.

WE ARE often called on to figure the area of a ring—the area that is enclosed between two concentric circles. The problem arises in connection with gasket areas, flash and butt welding areas of tubing walls, areas of pipes, etc. As an example, consider a typical problem:

What is the cross-sectional area to be flash welded of a tubular section having a 15⅜-in. OD and a 1⅜-in. wall thickness?

The usual way of computing it is rather laborious. We must figure the outside area by the πr^2 method and substract from this the inside area, also computed by πr^2. In this case, the area of the outer circle = $\pi(7\ 11/16)^2$; the area of the inner circle = $\pi(6\ 5/16)^2$. A comparatively simple problem can involve a lot of arithmetic.

The chart gives, without any figuring whatever, the area of any ring or concentric circle. To solve such problems, only two dimensions are necessary: the width of the ring or wall thickness, w, as shown in the left bottom sketch, and the distance D, also shown in the sketch. Please note that the distance D is neither the OD nor the ID of the ring. It is the distance from the inside edge to the farthest outside edge. The quick formula for finding D is: substract the thickness of the ring from the OD. In the problem mentioned above, therefore, D = 15⅜ — 1⅜ = 14 in.

Once you know w and D, simply run a straight line through the width w, as found in column A, and the distance D, as found in column C. The intersection of this line with column B will give the area of the ring.

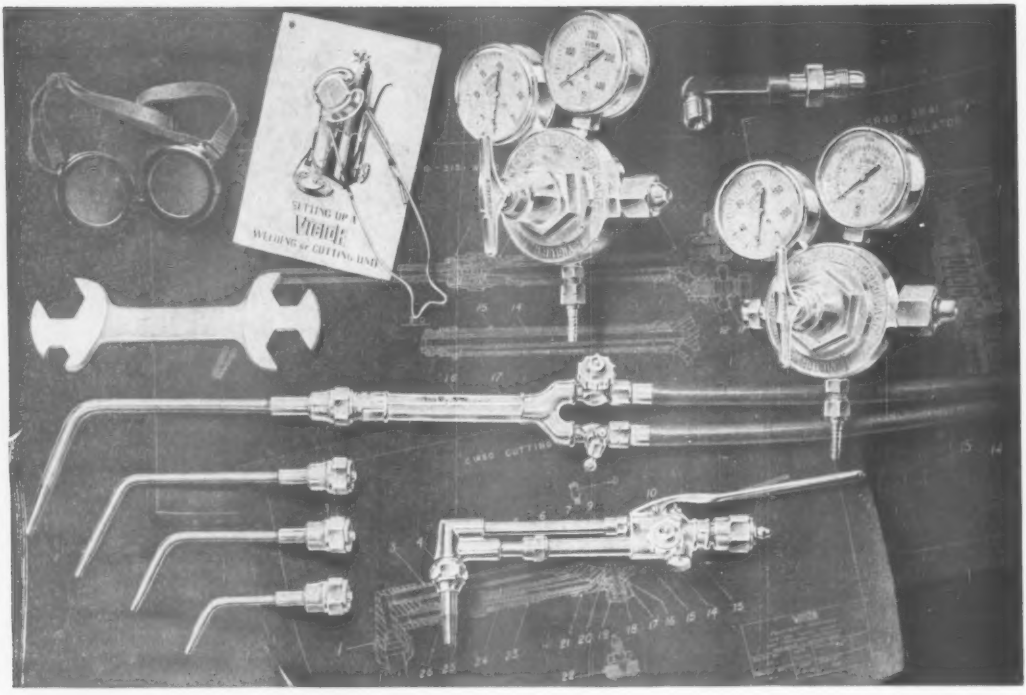
A simple example is illustrated by the dotted line. The width w of the ring is 1 in. and the distance D is 10 in. Looking at the intersection with column B, we can see that the required area of the ring is something over 30 in. Estimating with the eye and reading the scale in the same way that we read a thermometer, it is evident that the area is very close to 31 sq in.

Now let's try to solve our first problem on this chart. If we run the straight line from w = 1⅜ in. on A to D = 14 in. on C, the intersection with B will fall almost exactly on the 60 point. So the required area of the tubular cross-section is 60 sq in. Actual arithmetical computation gives:

Outer area = 185.627 sq in.; inner area = 125.159 sq in.; difference = 60.468 sq in. Try it and see.

If the figures on the chart are not large enough to take care of your particular problem, you may add ciphers. Say, for example, that the width w at the 1 point on scale A is 100 in. and the distance D at the 10 point on scale C is 1,000 in. The answer is still 31 plus an undetermined number of ciphers. Let's determine them. Well, we added two ciphers to column A and two in column C, so we should add four ciphers to the result in column B. Our answer, therefore, is 310,000 sq in.

In the same way, we can shift the decimal point over to the left in columns A and C if the figures on the chart are too large. All we have to keep in mind is that the answer will shift the decimal point to the left by as many digits as were shifted to the left in column A plus the digits shifted in C. For example, if w = 0.01 in. and D = 0.1 in., the decimal point is shifted 2 + 2, or 4 places to the left. The area, therefore, is 0.0031 sq in.



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The flexibility and wide range of Unit WC-26, shown here, enable you to do all usual welding and cutting operations, either in production or maintenance work. For special jobs such as hard-facing, multi-flame heating, deseaming, brazing, descaling, you simply add suitable tip, nozzle or attachment.

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VICTOR apparatus is designed for faultless, economical operation. See your VICTOR distributor for free demonstration TODAY.

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For Your Technical Library—

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A Welding Engineer Reader Service

1 WELDING CATALOG—The Burdett Oxygen Co., Cleveland 14. New 64-page catalog of gas and arc welding and cutting equipment and safety supplies has complete descriptions of all items. Pictures of almost all items listed aid in explaining their uses.

2 ELECTRODE HOLDER — The Fibre-Metal Products Co., Chester, Pa. Single-sheet two-color bulletin No. 33 pictures and describes the "Eureka" electrode holder. Insulation for tip, sleeve, collar, trigger, handle and screw is described. Soldered and quick removable connections are also explained. Page 62.

3 STAINLESS WELDING FITTINGS —The Cooper Alloy Foundry Co., Hillside 5, N. J. 48-page catalog on stainless steel valve fittings and accessories contains engineering drawings, weights, dimensions, size ranges, materials, corrosion data, nomenclature and design information. Cooper line includes welding and forged fittings, flanges, nickel gates, etc.

4 CABLE CONNECTOR — Mines Equipment Div., Joy Mfg. Co., Pittsburgh 22. Single-sheet two-color bulletin No. SM-1 shows and explains a new family of welding cable connectors. Such features as Neoprene coverings, quick-release mechanisms and tensile strength are discussed.

5 TUBE SHEAR—Vogel Tool and Die Corp., Chicago 47. Single sheet bulletin No. 252 describes the new Vogel tube cut-off machine for operation in your power punch press. Capacities, tolerances and operating features are discussed. See page 62.

6 SILVER BRAZING—Handy & Harman, New York City 7. 4-page bulletin tells uses of silver brazing on shotguns, door lock parts and other assemblies of mild and stainless steel.

7 BENCH VISES—Acme Tool Co., New York City 7. 4-page, illustrated bulletin shows various types of Acme precision bench vises. Cross-sectional views of the spindle mechanism are given and discussed.

8 HIGH-TENSILE WELDING — Arcos Corp., Philadelphia. 8-page, 6¼ by 9¼ in. booklet, "The ABC's of Welding High-Tensile Steels," to guide buyers and users of low-alloy, low-hydrogen electrodes. A question-and-answer technique is used to compare mild-steel and low-hydrogen electrodes with regard to preheating, underbead cracking, moisture in the arc and in the coating, burn-off rate, cost of operation, etc.

9 "VARI-PITCH" SHEAVES—Allis-Chalmers, Milwaukee. 12-page, two-color booklet describes the automatic "Vari-Pitch" drive and automatic sheave. This simple method of speed control is said to cover speed-changing needs from 1½ to 40 hp.

THE WELDING ENGINEER will request manufacturers to send readers the literature in which they are interested. Two post cards are printed here, each containing space for four items.

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10 WELDED TUBING—The Babcock & Wilcox Co., Beaver Falls, Pa. Revised handbook on methods of working seamless tubes and pipe, Bulletin 9B includes a completely rewritten and revised section on welding. Other information includes material composition, general characteristics, annealing, condensed technical data and reference tables.

11 ARC WELDER—The Lincoln Electric Co., Cleveland 1. New single-sheet bulletin describes the Lincoln 200-amp "Fleetwelder" for a-c welding. The "Arc-Booster" feature is explained, other features are listed. Specifications with and without condensers are included.

12 RESCUE MASK—Mine Safety Appliances Co., Pittsburgh 8. 4-page bulletin B-20 describes the M-S-A demand mask for 30-minute breathing protection in poisonous or oxygen deficient atmospheres.

13 CUTTING ELECTRODE—Eutectic Welding Alloys Corp., New York City 13. Single-sheet bulletin describes the Eutectic "CutTrode" for cutting metals. Sizes available, applications and prices are listed.

14 IDENTIFYING STAMPS—M. E. Cunningham Co., Pittsburgh 19. 4-page, two-color folder LF-50 pictures and describes various designs and figures of steel stamps for marking billets, ends, cuts, slabs and welds. Sizes and prices are included.

15 RUST PREVENTION—Rust-Oleum Corp., Evanston, Ill. Catalog describes rust-prevention methods for machinery, tanks, floors, walls, etc. More than 70 colors of the preventive are reproduced and identified. Its resistant qualities, drying time, thinner requirements and application methods are also discussed.

16 WHEEL ASSEMBLIES—Standard Equipment Co., Cedar Rapids, Ia. 4-page bulletin shows "Standard" axle and wheel assemblies for farm equipment, trailers, utility chassis, etc. Pictures show details of construction, stub axles, etc.

17 PRODUCT DEVELOPMENT—Sam Tour & Co., Inc., New York City 6. 6-page brochure explains the scope of services available, such as product development, research, production methods, expert testimony, non-destructive testing, laboratory testing, etc.

18 SILVER BRAZING ALLOYS—United Wire & Supply Corp., Providence 7, R. I. 4-page bulletin describes and lists prices for various quantities of silver-brazing alloy in coil and rod form. Last page shows how company's alloys conform to Army and Navy standards.

19 HARDNESS TESTER—Newage International, Inc., New York City. Bulletin ET-179 describes the "Ernst Hardness Tester" for direct readings of weld deposits, etc., in Rockwell or Brinell numbers. Operating instructions and principles are discussed. See page 60.

20 METAL CLEANER—Oakite Products, Inc., New York City 6. Pocket-size folder tells about Oakite Compound No. 33 for removing welding fluxes or rust preventives. Stamping oils, identification inks or other dirt can also be cleaned off to prepare the metal for paint.

21 MACHINING WELD DEPOSITS—Ampco Metal, Inc., Milwaukee 15. 12-page Bulletin 66A gives recommended practices for tool design, inspection and machining of "Ampco-Trode" weld deposits. Booklet also covers practices for machining, grinding, etc., of all grades of Ampco metals.

22 CYLINDER TRUCK — American Metal Products Co., Worcester, Mass. Single-sheet bulletin pictures and describes a new 2-in-1 cylinder truck and hand truck combination. When carrying cylinders, the truck looks like other models but can be folded for hand truck use or for storage.

23 WELDING CATALOG—K-G Welding and Cutting Co., New York City 1. 16-page catalog No. 50A gives pictures and descriptions of many types of helmets, eye shields, protective clothing, weld cleaning brushes, clamps, cutting attachments, electrode holders and welding goggles.

24 FLUX, PREHEATER—L. B. White Co., La Crosse, Wis. Two single-sheet, letter-head-size leaflets give information on new products of this manufacturer. One leaflet describes the new "Dirtywork" welding and brazing flux and the other is on White's bottled-gas utility torches.

25 MONEL DATA BOOK—The International Nickel Co., Inc., New York City 5. 24-page technical bulletin T-9 tells the engineering properties of "K" Monel and "KR" Monel. Contents include composition, mechanical properties, effects of temperature, working qualities, thermal treating, corrosion resistance and mill products.

26 FIRE EXTINGUISHERS — The Burdett Oxygen Co., Cleveland. Single-sheet, two-color mailing piece describes 5-lb, and 7½-lb "Burdox" carbon-dioxide fire extinguishers. These are said to stop gasoline, oil, grease or paint fires almost at once.

27 RECORD CONTROL—Remington Rand, Inc., New York City. 80-page, letterhead-size catalog, "Kardex Visible Record Control," describes various combinations of record forms and the variety of colored signal control methods that may be used. It also illustrates "visible" cabinets and insulated equipment for protecting vital records from fire.

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Solves Operators' 50-Year Old Problems!

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LESS FATIGUE... Operators no longer fatigued by noise of rotating parts. Lighter weight means easier handling on the job.

IT SAVES YOU $126 A YEAR IN POWER COSTS ALONE! The new Westinghouse has a no-load loss of only 500 watts compared to 2480-3600 watts on a conventional motor generator.

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We'll arrange a DEMONSTRATION OR TRIAL INSTALLATION . . . at no cost to you. Contact nearest distributor, or write Westinghouse Electric Corporation, Dept. DC20, P. O. Box 868, Pittsburgh 30, Penna. J-21595

Westinghouse
D-C Welders

on the job

Courtesy The Linde Air Products Co.

GONDOLA CAR, used for hauling scrap and hot slabs in a steel mill, has been badly damaged. Flame-straightening can put it back in shape

Courtesy Handy & Harman

INDEXING TABLE is combined with induction heating and prefabricated alloy (the square in the inset) to silver braze these parts

Straightening Bent Cars

(See left picture)

HAULING scrap and hot slabs in steel mills is tough on railroad gondola cars. Cranes, shovel dippers and the heavy scrap that's dropped inside can play havoc with them. When car sides are badly bent, the usual way of repair is to knock out the rivets and put the bent plates under a press. It takes from four to five days to dismantle, straighten and reassemble a car.

One steel mill has adopted a procedure that straightens the sides in half the time and at a saving of around $250 per car. It's a flame-straightening deal that makes use of a large-capacity oxyacetylene torch equipped with a multiflame heating head. After the bent portions of the car are heated, they are forced back into shape by jacks.

Using this simple method, the steel company puts a badly damaged gondola car back into first-class condition in only two days.

* * *

Mechanized Silver Brazing

(See right picture)

IN VOLUME production with silver-alloy brazing, the trend is toward almost complete mechanization. The heating equipment is arranged with a conveyor line or an indexing table. Parts are positioned by carefully tooled jigs. The alloy itself is preformed to the proper shape for the particular parts and preplaced when the parts are jigged. Automatic heating controls and automatic ejectors complete the picture.

An excellent example is found in the production of "roll backs" for door locks. These stamped steel parts are fluxed and assembled with a tiny square of silver alloy between the teeth (see inset at top right of the picture).

As soon as the operator has completed three assemblies in each jig, the machine takes over. An air-driven plunger shoots forward to clamp the assemblies. A movable induction-heating coil drops into position. After a controlled 9 seconds of heat, the coil goes up, and the table indexes. The assemblies ride two stations while the brazing alloy sets. Finally, a second air-operated plunger pushes the finished assembly from the table into a shipping crate.

This mechanical set-up lopped off a third the cost of producing 500,000 roll backs. The company could double production by adding a second heating station and another operator to the present indexing table.

* * *

Welded Kitchen Equipment

By Paul C. Ziemke

DID YOU EVER eat with a group of hungry construction workers? The kitchen employees have to "lay it out" in both quantity and quality, and the mass and mess of dirty dishes and utensils can be a staggering clean-up job.

SHOP WELDORS built the dishwashers and stainless-steel sink to help out the boys and girls working in the cafeteria kitchen

To help out the guys and gals who work in the kitchen, our shop built a stainless-steel sink and two dishwashers (see bottom picture). These cut the job right down the middle for a 50% saving in time and drudgery.

The front sections of the washers were bolt assembled to permit access to the motors and pumps, but the supporting legs of both washers and tubs were weld fabricated. The neat edges on the tub indicate not only welding skill but the ability to do a good job of dressing the edges with a grinding wheel. Looks like factory-made equipment, does it not?

* * *

Airborne Printing Press

By John Kent

A 2,400-LB weight reduction was accomplished in the redesign of the Army's new "airborne" map printing press, principally by the use of welded steel plates in lieu of heavy castings.

The pilot model of the lighter press was designed at the Army Engineer Research and Development Laboratories, Fort Belvoir, Va., and was built by the Webendorfer-Wills Division of American Type Founders. It is now completing initial tests prior to trials by troops in the field.

The press will produce 22 by 29 in. multicolored maps and charts. It is built of ½-in. welded steel plates and can be moved as a unit without dismantling it. It weighs only 4,200

MOBILE, AIRBORNE printing press weighs not much over two tons or ½ less than the old model. Base and side frames are welded

lb as against the old model's 6,600 lb. Though size has been reduced somewhat, nothing has been sacrificed in performance.

Height was reduced from 72½ in. to 60 in., length from 89 to 73 in. There are also fewer rollers: three instead of four form rollers. These are hollow cylinders instead of solid castings, accounting for considerable of the reduction in weight. The number of copies held in the delivery stack is also smaller on the new model.

The idea of the redesign was to produce a press both light enough and small enough to be transported intact by air or truck right up to where it's needed. This has been accomplished.

* * *

Longer-Lived Hose

By Andrew Vena

THE END of a welding hose that is nearest to the torch is the "business end." It naturally gets the most use, abuse, scuffing, kinking, sparks and burns. Consequently, it will be the first to fray or spring a leak.

When that happens (or looks like it was going to happen), most welders simply cut off the worn portion and throw it away. Instead of shortening the hose, try this:

Watch the hose carefully for wear. When it shows definite signs that the welding-torch end is not all that it should be, reverse the hose end for end, changing the end connections if necessary. This will give the overworked end a chance to rest and bring the fresh end into service. You will avert an early leakage and greatly lengthen the service life of the entire length of hose.

No use throwing away a length of hose when only one end is bad, is there?

WeldOlets, Butt Welding — Available as standard, with outlet sizes from ⅛" to 24", both straight and reducing for use with Schedule 40 pipe up to 12" outlet. Outlet sizes 12" - 24" for standard weight pipe (⅜" wall). Also available for Schedule 80 service: through 8" outlet and extra strong through 24" outlet size (for use with pipe having ½" wall).

You write

SPEED, ECONOMY AND FULL PIPE STRENGTH

***into the job when you specify* WELDOLETS**

With WeldOlet branch pipe welding fittings you provide the quickest, most economical, most satisfactory method of obtaining full pipe strength at branch connections.

Note in the above illustration how the WeldOlet tapers to provide a single bevel groove joint at the crotch section and blends into a V-butt joint at the ear portion.

WeldOlets need no additional reinforcement to establish and fully maintain original strength on ASTM A-106 Seamless Steel Grade A Pipe, as set forth in Code for Pressure Piping, American Standards Association, B31.1-1942, and Supp. No. 2, B31.1-b-1947.

To meet special conditions, these fittings can be furnished in any forgeable metal including wrought iron, toncan iron, nickel, Monel, Everdur, stainless grades 304, 316, 347, etc.

For detailed engineering reference data, write for Catalog W-2.

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WELDOLETS

FOR WELDED BRANCH PIPE OUTLETS

WeldOlets, Socket Welding —Available as standard, with outlet sizes ⅛" - 10", both straight and reducing, for use with Schedule 40 pipe. Also available in Schedules 80 and 160 up through 4" outlet size.

ThredOlets — Available as standard, with outlet sizes ⅛" - 10", both straight and reducing, for use with Schedule 40 pipe. Also available in Schedule 80 up through 2" outlet size.

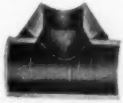

Fig. 1 — Cut-away view of reducing size WeldOlet with welding outlet in place. The external rib and wide bases or footings of WeldOlets eliminate the need for extra supports to take care of bending or vibrational stresses at crotch section, the point of greatest stress.

Fig. 2—Note blending of ear portion of welding fitting to run pipe. Extension of weld metal below inside scarfed portion of pipe insures all sections of joint greater than pipe wall thickness.

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It's a storehouse of facts and data — 28 pages of useful information by the originators of *EASY-FLO* and *SIL-FOS*. Tells WHERE and HOW to use these silver brazing alloys to the best advantage; shows many time-tested applications; describes fast brazing techniques; tells how you can speed up production and *save*. It's a "must" for all who design or produce metal assemblies. *WRITE FOR YOUR FREE COPY TODAY. ASK FOR BULLETIN 20.*

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32ND METAL SHOW

(Continued from page 38)

large area of the International Amphitheatre has been reserved for entries in the fifth Metallographic Exhibit of the American Society for Metals. Micrograph studies of cast iron and steel, tool steels, alloys, light and non-ferrous metals, stainless and many other types of steel will be on display: some as transparencies, others as photographic halftones. A blue ribbon will be awarded to the best entry in each of the dozen different classifications. A grand prize, consisting of an engrossed certificate and a money award of $100, will go to the exhibitor whose work is judged "best in the show."

Exhibitor Movies

The success of the "economy theatre" presentation during the 1949 Metal Show in Cleveland called for a repeat performance. The management of the Metal Show has arranged facilities for the showing of films that have a definite contribution to make to production savings and greater output. They will establish complete set-ups for exhibition, including licensed operators and projection equipment. Each exhibitor's film will be allotted a specified period in one of the theatres, and schedules will be published during the show.

Sponsors of the 32nd Metal Show are the American Society for Metals, the American Welding Society, the Metals Institute Division of the American Institute of Mining and Metallurgical Engineers and the Society for Non-Destructive Testing. The American Society for Metals (Palmer House) and the American Welding Society (Sherman) will hold morning, afternoon and evening sessions throughout the week. The Metals Institute Division, AIMM (Sheraton) will hold daily and evening sessions Monday through Wednesday. The Society for Non-Destructive Testing (Morrison) has scheduled morning and afternoon technical meetings on Tuesday, Wednesday and Thursday.

Managing director of the 32nd National Metal Congress and Exposition is W. H. Eisenman. Chester L., Wells is assistant director and floor manager. Headquarters are at 7301 Euclid Ave., Cleveland 3.

P&H helps you

cut fabricating costs on "hard-to-weld" steels •

Have superior physical qualities — ideal for welding heavy sections that must withstand severe shock and abuse.

Low-Hydrogen Electrodes

- ***For problem steels:*** High carbon, high sulphur, cold-rolled, alloy... *70LA.*
- ***For steel castings repair;*** matches analysis and heat-treating properties of Grade B castings... *P&H25C.*
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- ***To match heat-treating properties of SAE 1040*** and like steels. Also for steel-castings repair... *P&H40C.*
- ***For welding high hardenable steels.*** Also steel castings repair... *AW2B.*
- ***For repair welding Grade C castings*** and steels of similar composition... *P&H#7.*
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- ***For welding high hardenable steels*** without preheat such as re-rolled rail stock... *P&H#12.*
- ***For aircraft and similar steels*** . . . has wide range of properties under heat treatments... *P&H#21.*

Withstand high amperages and have high deposition rate. Operators burn more rod per hour, weld faster at lower costs.

These rods operate with stable arc on AC or reverse-polarity DC. Other money-saving features are: Elimination of underbead cracking. Low hydrogen content for successful enameling. Little or no preheating. Minimum spatter. Excellent appearance of weld... freedom from surface holes. Order from your P&H representative or local P&H distributor. Send coupon for detailed information.

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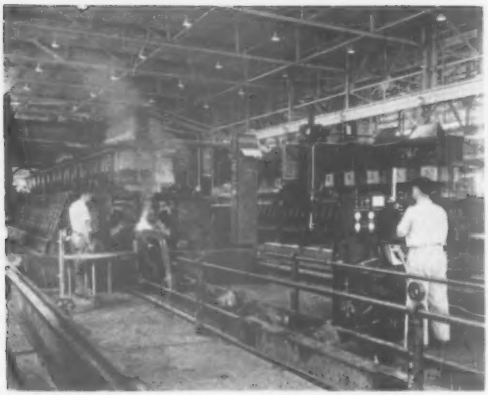


WELDED TRUSSES soar over big resistance pipe welders in the new A. O. Smith Corp. of Texas plant. Building was completed in months

SEALED WELDED box sections in world's largest single-leg gantry crane cut down corrosion. Welding gives high torsional rigidity

NEWS

A. O. Smith Texas Plant Ships 30-In. Welded Pipe

(See picture at left)

A. O. SMITH Corporation of Texas is shipping 30-in. welded steel pipe for natural gas transmission lines from its new $5,000,000 plant. Only a few months ago there was only a vacant site. The plant was designed, built and equipped by The Austin Co., a Cleveland contractor, in nine months.

The speedy job was due in part to use of standard 80-ft welded H-section trusses and 40-ft jack trusses supplied from Austin's fabricated stock. There is a 33-ft clearance below the trusses in the plant's two 675-ft-long craneway aisles.

Production of welded pipe will reach 40,000 tons per month in October, say company officials. At present the plant can make pipe in 16 to 36 in. OD sizes. Additional facilities will increase its size range from 8 5/8 in. to 36 in. At present the plant is tooled up to produce 1,000 miles of 30-in. pipe for the Texas-Illinois Pipe Line Company to carry natural gas from Texas to Chicago.

* * *

Farm Welding Award Program for High School Students

HIGH SCHOOL students studying vocational agriculture will be given the opportunity to earn a prize up to $600 and win national recognition. The occasion is the new $7,000 arc-welding award program conducted by The James F. Lincoln Arc Welding Foundation, Cleveland.

Rules for the contest were formulated by high school teachers from over 30 different states. For the best descriptions written by students of how arc welding was used or could be used on a farm project, 100 cash awards will be made, totaling $5,000. The additional $2,000 allotted to the program will be made to the schools in which the first ten award winners are enrolled.

First award to students is $600, second $400. The other 98 awards range from $200 to $25. Any vocational student enrolled in a high school and who is a member of a farm family actively engaged in farming can compete.

* * *

All-Welded 125-Ton Crane Serves Bessemer Converters

(See picture at right)

THE LARGEST single-leg gantry crane in the world features hermetically sealed welded box sections in its girders and leg. This 125-ton crane was built by The Cleveland Crane & Engineering Co., Wickliffe, O., to serve Bessemer converters at the National Tube Co., Lorain, O.

The crane is also unique because of its shaftless bridge drive. Most bridge drives for long span gantries employ motors, mounted on the bridge girders, to drive the track wheels through line shafting, flexible couplings, bevel gears and universal joints. Here the crane bridge rides on eight equalizing-type two-wheel trucks, driven by four direct-connected individual motors. No provision is made to synchronize the motors. The all-welded design of the crane, incorporating a welded box-section portal-type leg, provides maximum torsional rigidity to assure proper alignment of all parts.

National Tube's Lorain works, where the new 125-ton crane is installed, is claimed to be the world's largest pipe mill. It produces seamless pipe in 2 to 26 in. OD.

* * *

Cast-Weld Design Contest Offers $1,000 in Prizes

A NATIONAL awards program with $1,000 in cash prizes for the best papers on new or redesigned steel castings (including cast-weld construction), conversion or new applications has been announced by the Steel Founders Society of America. In all, 15 awards will be made with a top prize of $300. There will be two awards of $200 and $100 each, four others for $50 each and eight $25 awards. The contest is open to everyone except employees of the society and of member companies. Closing date is Dec. 1, 1950.

Subject matter of the papers should include: (1) new or redesigned steel castings (complete in themselves or joined by welding) that have never been in production; (2) conversions, either parts or products formerly made by other methods than steel casting; (3) new applications for steel castings.

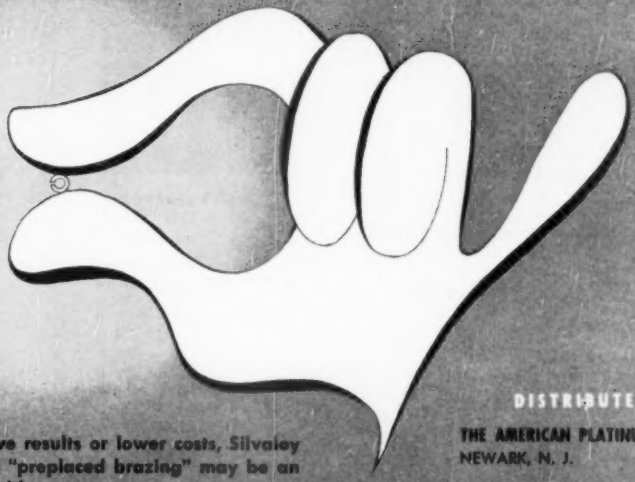
Papers should be sent to Award Committee, Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15.

SEE SILVALOY WORKING EXHIBIT — BOOTH 1902 32nd NATIONAL METAL SHOW · INTERNATIONAL AMPHITHEATRE · CHICAGO OCT. 23-27!

SILVALOY

SILVER BRAZING ALLOYS

"preforms"



To speed production, improve results or lower costs, Silvaloy rings, forms and shapes for "preplaced brazing" may be an excellent answer to your problems.

The expert Silvaloy technical advisory staff as well as our unique facilities for the fabrication of all types of preplaced brazing forms are available to all Silvaloy users. Take full advantage of these services.

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APW

Announcing

The EUTECTIC WELDING ALLOYS CORPORATION

$1000.00 PRIZE COMPETITION

To Welding Engineers, Researchers, Metallurgists, Instructors, University Students and all others qualified . . .

for papers on

Technological and Research Aspects, Advances and Advantages of the Use of Lower Melting (lower than parent) Filler Metals in the Non-fusion Welding Processes.

R. D. Wasserman
President

AWARD FUND

FIRST PRIZE	$500.00
SECOND PRIZE	300.00
THIRD PRIZE	200.00

Rules of the Competition

(1) The competition is open to all persons qualified to present basic principle, theory or the results of practical research and experience in the field of non-fusion "lower melting" (lower than parent) filler metals in welding, except employees of Eutectic Welding Alloys Corp., its advertising agencies, and members of their families.

(2) Participants in the competition may submit welding papers on one or more of the following subjects:

(a) Oxy-acetylene, low melting filler
(b) Oxy-fuel gas, low melting filler
(c) Brazing and bronze welding
(d) Hard facing and resurfacing, with a low melting filler

The welding application may be by torch, furnace induction, carbon arc or electric arc.

(3) Papers are to be presented in English and should be typewritten.

(4) Papers should be confined specifically to the field defined above and may be documented with photographs, test data or other material to substantiate and verify the thesis presented or described.

(5) All papers must be the original, previously unpublished work of the participant and must bear his name and address.

(6) Papers will be judged by The Jury and Committee of Awards on the basis of the merit of the theory or practice presented. Decision of the judges will be final. All entries and ideas therein become the property of Eutectic Welding Alloys Corporation and none will be returned.

(7) The competition opens Sept. 1, 1950 and closes May 31, 1951 midnight. All entries must be postmarked on or before that date.

(8) Winners of awards will be notified by mail within approximately 60 days after the close of the competition. Complete list of winners will be sent to all participants requesting it.

THE JURY and COMMITTEE of AWARDS

Dr. Th. I. Leston, Vice President, Eutectic Welding Alloys Corporation
Prof. Otto H. Henry, Dept. of Metallurgy, Polytechnic Institute of Brooklyn
Dr. Robert Humphrey, Vice Chairman, American Society for Metals

Papers should be directed to:

Welding Research Competition
EUTECTIC WELDING ALLOYS CORPORATION
40 Worth Street, New York 13, N. Y.

Safety Principles Stated by President's Conference

RECENT report made by the 35-man committee on labor-management coöperation for safety, as part of the President's Conference on Industrial Safety, included these fundamental principles:

Safety, said the report, is primarily the legal and moral obligation of the employer. To demonstrate his sincere interest in the safety of employees, he can: (*a*) initiate sound safety programs with the staff members, policies and procedures necessary to make them work; (*b*) provide safe working conditions, machinery and equipment and personal safety protective devices and apparel; (*c*) develop effective training programs for supervisors and employees and (*d*) encourage employee interest and participation by welcoming suggestions, advice and recommendations for safety.

Management must have the authority necessary to carry out its responsibility. No steps should be taken that create confusion and uncertainty about such authority.

Coöperation in the safety program is the moral obligation of each worker. This he demonstrates by: working safely at his job, having regard for safety of fellow employees, using his knowledge to prevent accidents, calling attention to unsafe conditions and contributing his ideas, suggestions and recommendations.

In unionized plants, the welfare of the employees places upon the labor union a moral obligation to coöperate in accident prevention, within the framework of its agreed participation. This is demonstrated by the union when it takes its agreed part in the safety program, uses its influence in encouraging employees to work safely, or promotes accident prevention through its publications, and at union meetings.

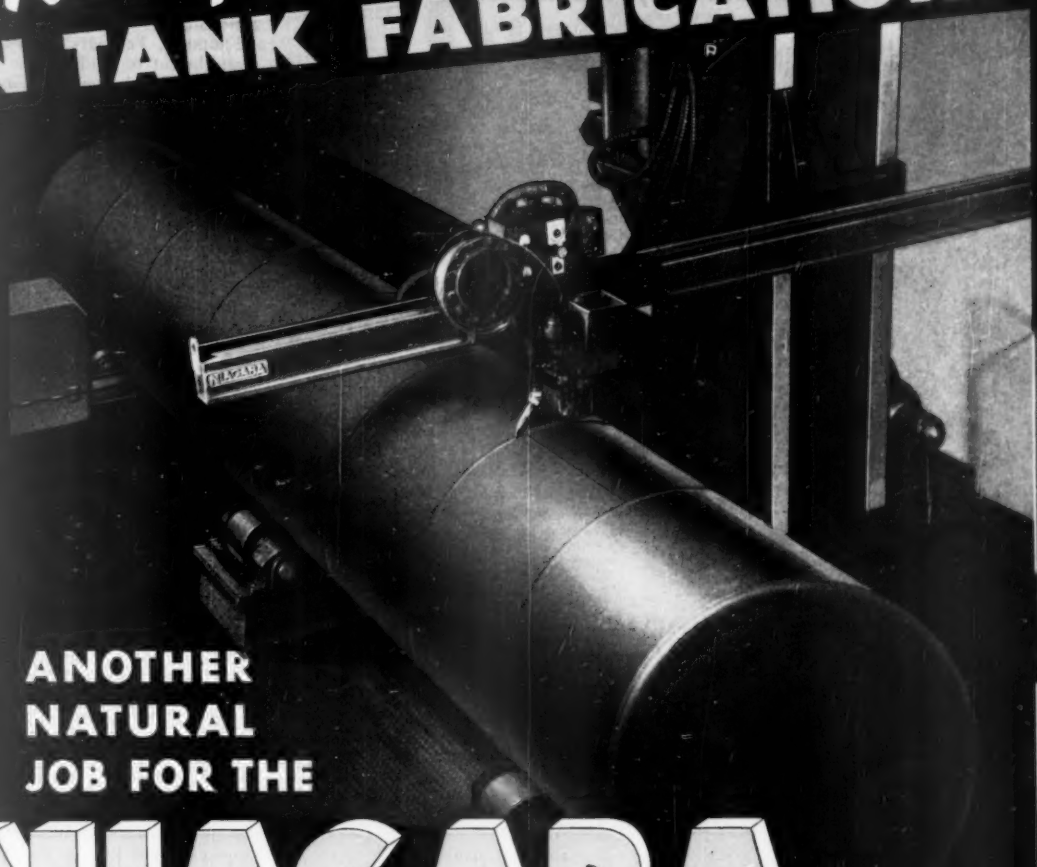
* * *

Milburn Moves to New Plant

ALEXANDER MILBURN, Inc., manufacturer of oxyacetylene welding and cutting apparatus, will carry on manufacturing and sales operations at its new headquarters at 1231-45 Ridgely St., Baltimore 30. The building has 8,000 sq. ft. of manufacturing area.

W. L. Lawrence is president, Emory Lawrence vice-president and L. H. Denton, secretary. The Milburn name was recently revived after some years in eclipse (see THE WELDING ENGINEER, page 60, Sept., 1950).

The New Look
IN TANK FABRICATION



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Electronic Automatic
WELDING MACHINE

LONGITUDINAL WELDS AND CIRCUMFERENTIAL WELDS

At finger tip control with infinitely variable speed in either direction to suit weld size and tank diameter.

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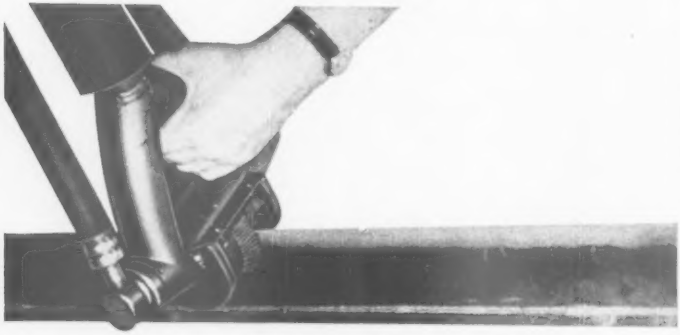
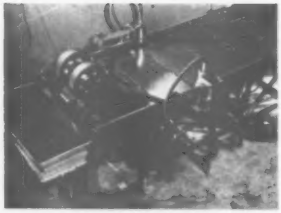
as fast as you can weld it

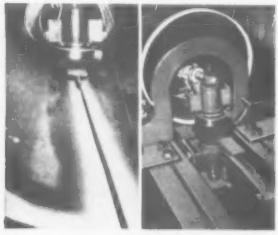


HIGH SPEED WELDING

with no weld porosity



"A strip along both edges (top and bottom) and the thickness of steel sheet are cleaned to bright finish at high speed. Fully automatic."



"Edge cleaning after rolling (left) and cleaning inner and outer periphery and end of steel cylinder (right)."

Amazing new Vacu-Blast equipment makes high-speed welding vastly more efficient. Uses and re-uses crushed steel or other abrasive to clean metal surfaces to bright, dry, dust-free finish. Eliminates weld porosity caused by gas resulting from rust and scale. Clean contact prohibits electrode arcing. Makes possible a perfect weld seam at high speed.

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"Trap Weld" Is Newest Type of Cold Weld

KOLDWELD CORP., New York City, was queried by several manufacturers of kitchen utensils with regard to possibilities of using the cold-welding process (see THE WELDING ENGINEER, February, 1950) for the attachment of studs to the sides of utensils. If this could be done, knobs and handles could be screwed on the studs to replace present riveted assemblies. The rivets on a pot or pan almost invariably loosen after a while because of the many heating and cooling cycles to which a cooking utensil is subjected.

President William Dubilier and his associates at Koldweld pondered the problem a while and came up with a new wrinkle: the trap weld. Either a screw stud or a threaded insert can be molded directly into the aluminum base metal by using this pressure-welding process with a specially designed die or welding tool. If desired, the stud or threaded insert can be of steel and embedded in an aluminum utensil.

Similarly, Dubilier states, different types of metal inserts or parts can be molded between dissimilar nonferrous metals. For example, a thin steel insert, such as a sheet or wire netting, could be molded within aluminum sheets.

The trap weld can be used to produce the female counterpart of the screw stud. Several methods have been developed for forming the threaded insert during the welding operation. In one example, the threading is obtained by molding the base around a steel screw, then removing the screw and leaving the thread inside the base. Another method is to form the base around a threaded steel nut or insert.

* * *

Steel Capacity to Rise to 106 Million Ton Rate

THE United States steel industry will increase its capacity to nearly 106 million tons by the end of 1952, says the American Iron and Steel Institute. Output now is 100.5 million tons.

To show the tremendous output of one day's steel production, the following items could be built from it: one aircraft carrier, 500 airplanes, 1,000 anti-aircraft guns, 500 tanks, 500,000 3-in. shells, 1,000 howitzers, 2,000 bombs, two heavy cruisers, 1,000 freight cars, 2,000 trucks, two cargo ships, two tankers, 12,000 autos, 2,000 homes, 20,000 stoves and 20,000 refrigerators. After that, 23,000 tons would remain for other uses.

BUSINESS OPPORTUNITIES
Representatives of Cyc-Arc Ltd., London, England, now in the United States are prepared to negotiate a licence agreement for manufacture and sale of their patented stud-welder, studs and accessories.

SEE CYC-ARC STUD WELDERS AT BOOTH 2654

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OCT. 23-27 **INTERNATIONAL AMPHITHEATRE** CHICAGO

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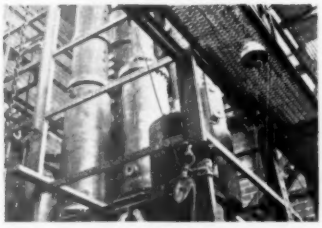

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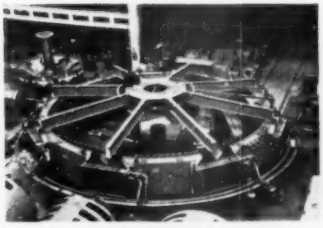

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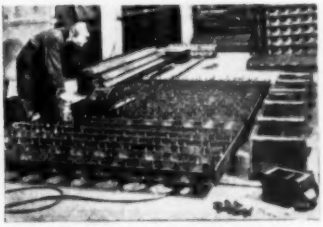

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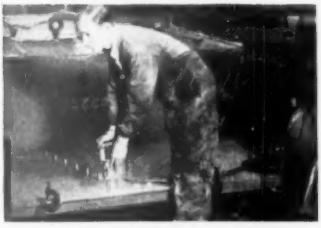

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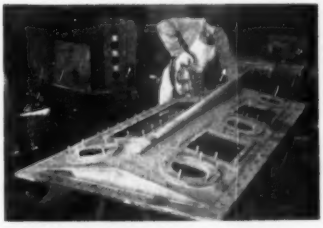

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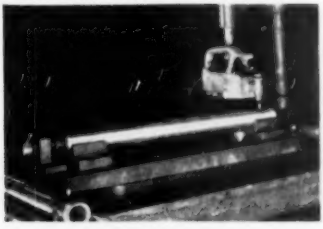

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STELMAR HOUSE, 27 NEW NORTH RD.
LONDON, N.1, ENGLAND

IN THESE & MANY OTHER INDUSTRIES, USING CYC-ARC WELDERS MEANS

- **SAVING MATERIALS COSTS**—studs are low priced
- **SAVING LABOR COSTS**—$\frac{1}{4}$" dia. studs welded in under a minute, smaller studs faster.
- **SIMPLICITY**—the standard equipment without change welds mild or stainless, brass, monel or aluminum (without inert gas shield).
- **GREATER RANGE**—stud attachments $\frac{1}{16}$" dia. or less to $\frac{3}{4}$" dia. or more.

120 Years Accumulated Experience To Help You Solve Welding Problems

Stainless . . . Low Alloy High Tensile . . . Non-Ferrous

Here's a picture of Arcos welding experience at work—the technical staff in a huddle over a customer's problem. They can answer more than "What electrode should I use?" Typical of the questions they answer every day are . . . "What cooling rate do you use when welding 7% chrome pipe?" "What electrode do you use for welds when operating temperatures are -40° F.? -150° F.? -320° F.?

Arcos engineers know the importance of uniformity in electrode manufacture for consistently good welding results. The many rigid production quality controls assure consistently high quality weld metal.

On that tough welding job, try Arcos electrodes and measure your savings in less rewelding. Available from nearby distributor stocks in all standard types and sizes.

ARCOS CORPORATION

1500 South Fiftieth St., Philadelphia 43, Penna.

WELD WITH ARCOS

Specialists in Stainless, Low Alloy and Non-Ferrous Electrodes

Name Winners in Lincoln Undergraduate Prize Contest

FIRST PRIZE winner of the 1949-50 Engineering Undergraduate Award and Scholarship Program of the Lincoln Foundation is Gordon Dickson Orr, Jr., of Meriden, Conn., an engineering student at Rensselaer Polytechnic Institute. Orr's paper, "A Comparison of Framing in Welded Steel and Aluminum," was deemed good enough to bring him a cash award of $1,000 and to establish four scholarships under his name in the Rensselaer department of architecture.

Francis Springer and Earle Compton, both enrolled in the department of mechanical engineering, University of Iowa, Iowa City, Ia., received $500 to be divided between them for their paper, "Investigation of Some Practical Applications of the Low-Hydrogen Type of Electrodes." Another $500 went to the University of Iowa for scholarship funds.

Jerry J. Watson, a resident of Seattle, won a $250 scholarship for Oregon State College and another $250 for himself. Watson's paper, the third-prize winner, was entitled, "A Study of Arc-Weld Fabrication of Turret Tools for Turret Lathes."

The papers were judged by a jury headed by Dr. E. E. Dreese, chairman, department of electrical engineering, Ohio State University. Other jurors were: Gilbert S. Schaller, professor of mechanical engineering, University of Washington; Emmett B. Moore, chairman, department of civil engineering, State College of Washington; J. B. Wells, professor of structural engineering, Stanford University, and S. H. Graf, professor of mechanical engineering, Oregon State College.

* * *

L. C. Morrow Named for Maintenance Post

L. C. MORROW, consulting editor, *Factory Management and Maintenance*, a McGraw-Hill publication, will serve as chairman of a 16-man exhibitor's advisory board for the Plant Maintenance Show at Cleveland, Jan. 15-18. Mr. Morrow is also chairman of the concurrent conference on plant maintenance techniques.

Other members of the advisory board include D. F. Beard, advertising director, Reynolds Metals Co.; S. W. Corbin, assistant manager, industrial divisions, General Electric Co.; Orville C. Hognander, vice-president, G. H. Tennant Co., and C. F. Radley, publicity director, Oakite Products, Inc.

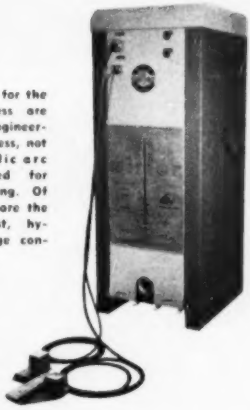
miller

WELDERS FOR BETTER WELDING AT LOWER COST!

For better welding — at low cost, select from MILLER's complete line of arc and spot welders, the dependable, field-tested model that fits your needs.

MILLER-built welders are constructed of top quality materials by skilled craftsmen. They are designed and engineered for long, trouble-free service. Satisfied users of MILLER welders throughout the world are today obtaining clean, fast welds with a minimum of maintenance cost and down time.

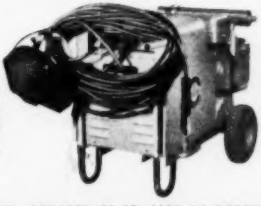
Regardless whether your requirements call for inert-arc welders, heavy duty or intermittent duty industrial arc welders, engine-driven arc welders for field use, or portable or stationary spot welders, your MILLER distributor can provide the model that will give you better welding — at lower cost. If the nearest MILLER distributor is not known to you, write the MILLER plant for his name and address. Do it today.



MILLER welders for the "Heliarc" process are designed and engineered for this process, not merely metallic arc welders adapted for "Heliarc" welding. Of special interest are the units with fast, hydraulic amperage control.

MILLER industrial welders are available in price ranges and amperage ranges to fit every requirement. The Model 88 illustrated is especially desirable in that it provides a welding current range of from 20 to 300 amperes at an extremely low cost. Other industrial welders with amperage ranges up to 1875 amps. are available.

MILLER portable spot welders are as handy to use as an electric drill or any other portable electric tool. The Model MSW and the Model LMSW-52 are available as portable units only. The 10 and 20 KVA models are designed for heavier production spot welding and are available in either portable or stationary models. Due to the design enormous capacities are obtained at low KVA input.



An extremely popular MILLER model is the AEA-200-L. As a welder, the machine will deliver a full 200 amperes of welding current. The machine can be converted to a 3 KW A.C. power plant merely by throwing a conveniently located switch. A Welder-Power Plant Combination all in one compact unit.

SEE THESE UNITS DEMONSTRATED AT THE NATIONAL METAL EXPOSITION IN CHICAGO, OCTOBER 23-27, 1950 IN BOOTH 1731

miller ELECTRIC MANUFACTURING CO.

APPLETON, WISCONSIN

REGO

TWO-STAGE
REGOLATOR

Precision Regulation
for
OXYGEN
ACETYLENE
HYDROGEN

The precision performance of the two-stage RegOlator is especially desirable for piped distribution systems and other applications where large volumes of high pressure gases must be controlled accurately.

Two-Stage RegOlator Gives You Plus Performance!

Constant delivery pressure regardless of drop in pressure at the inlet... Patented design incorporates nozzle-type first stage counterbalanced by stem-type second stage... Triple action cartridge filter eliminates troubles usually caused by rust, dust or dirt.

Listed by Underwriters' Laboratories, Inc. and Factory Mutual.

Write for complete information.

*Reg. U. S. Pat. Off.

The BASTIAN-BLESSING Company
4201 West Peterson Ave. Chicago 30, Illinois

PIONEER AND LEADER IN THE DESIGN AND MANUFACTURE OF PRECISION EQUIPMENT FOR USING AND CONTROLLING HIGH PRESSURE GASES

Aluminum-Steel Blades for British Gas Turbines

BI-METALLIC gas-turbine stator blades having aluminum-alloy roots for easy machining are being studied in England by Wellworthy Pistons, Ltd. Wellworthy holds the British license for the "A1-Fin" aluminum-to-steel bonding process, developed by A1-Fin Division of Fairchild Engine and Airplane Corp.

Bright drawn steel strip is used for the airfoil section. It is cropped to length, and an aluminum root bonded to it by the special process. Easy machining of the root makes blades much less expensive. Development of blade units in segments is foreseen; each segment would contain a number of blades, or even complete stage rings, with blade sections made integral by bonding of the strip steel.

The bond is claimed to have a tensile strength of 15,000 psi and to retain its strength at temperatures up to 700 F. The bond is also said to be vibration proof and leakproof both to hot oil and to diatomic gases under high pressures.

* * *

Sam Tour Offers "Hot Radiography" Service

RADIOGRAPHY during intermediate stages of welding is said to be possible with the McElroy-McNutt process of "hot radiography." Successful radiographs have been made, it is said, with the metal as hot as 900 F. The method is claimed to save much time and avoid delays during the fabrication of pressure vessels for power plants, oil refineries, and synthetic chemical factories. Sam Tour & Co., New York City, now has the exclusive license to use and to sublicense the use of the process.

"I see spots instead of sparks!"

This new WELDING DESIGN MANUAL

EUTECTIC

yours . . . FREE for the asking!

To assist you in your re-tooling problems . . . or to help you analyze your present welding methods so that you may enjoy maximum speed, efficiency, and economy in many of YOUR production problems, EUTECTIC offers — FREE of charge and without obligation — this new, packed-full-of-information book!

Over 40 pages of helpful data covering basic and advanced welding techniques and designs used in fabricating and assembly. Profusely illustrated with scores of application drawings, weld diagrams, how-to-do-it sketches, etc. In addition, you will find page after page of tables containing latest information on melting temperatures, tensile strengths, corrosion factors, nomenclature, alloy recommendations, etc. Convenient digest size.

This just-off-the-press book is "must" reading for anyone engaged in defense production and design, and will certainly be time profitably spent for any production man.

THIS PARTIAL LIST OF CONTENTS SHOWS THE WEALTH OF VALUABLE INFORMATION IN THIS HANDY MANUAL— *yours FREE*

Definition of Terms • Technology • Temperatures of application • Joining Methods: Torch Joining; Arc Joining; Induction Joining; Furnace Joining; Inert Arc Joining • Recommendations of Types of Joint and Heating Methods • Design Information: Square Butt Joint; Lap Joint; Flange Joint; Beveled Butt Joint; Fillet Weld; Overlay • Fluxing and Removal of Flux • Inspection and Control • Heat-treating of Welded Parts, and Welding of Heat-treated Parts.

—AND SCORES MORE . . . INCLUDING sketches and data on welding alloys for use with: cast iron, all steels, stainless steel, copper, brass, bronze, nickel and its alloys, magnesium, aluminum, hard and machinable overlays, etc., etc., etc!

Re-Tooling Now? . . . or Later??

Some firms have already started their re-tooling operations, some are still in the planning stage. Regardless of which stage YOU are in, it will pay you to start checking up NOW on the latest welding techniques and on the many ways you can speed productive output while you cut production costs through a revision of *your* welding designs and techniques. *Send for your FREE copy of this helpful manual TODAY.*

SEE HOW 10 years of EUTECTIC'S continuing welding research have evolved radically new metal joining techniques and designs.

WHY over 67,000 plants throughout America specify genuine "EUTECTIC" for all their welding alloy needs.

WHICH of your present designs can be altered to take advantage of these new production methods.

CLIP AND MAIL THIS COUPON TODAY

EUTECTIC WELDING ALLOYS CORPORATION
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This new manual of yours sounds like a very helpful book. Send me a FREE copy with the understanding that there will be no cost or obligation now or later.

Signed _____

Firm _____

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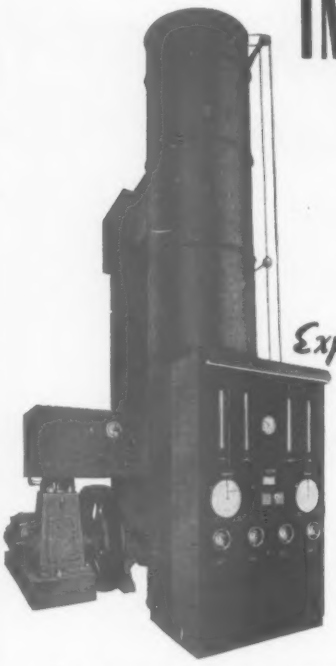
City _____ *State* _____



INDEPENDENT

Gas Producing

PLANTS

Expansion Engine Type —Medium Pressure

OXYGEN & NITROGEN

Producing Plants

Built in standard sizes as listed below in single and double rectification units. Streamlined panel provides quick visibility of all gauges. Compact design—requires minimum of floor space.

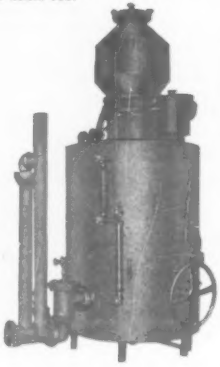
SIZES IN METERS AND CUBIC FEET

15 Meters or 530 cubic feet	75 Meters or 2650 cubic feet
30 Meters or 1060 cubic feet	100 Meters or 3530 cubic feet
40 Meters or 1412 cubic feet	150 Meters or 5300 cubic feet
55 Meters or 1940 cubic feet	200 Meters or 7060 cubic feet

Larger sizes also available

LOW PRESSURE ACETYLENE GAS PRODUCING PLANTS

This 600-lb. Acetylene generating Plant is one of the safest plants manufactured. Automatic controls minimize the operating personnel. Capacity 2700 cu. ft. per hour. Generator only is illustrated. Affiliate units are designed to insure maximum production at minimum costs. Complete details of construction and plant layout on request.



We Invite YOUR Inquiries

INDEPENDENT ENGINEERING COMPANY, Inc.

Manufacturers of

CONSULTING · RESEARCH · DESIGNING

CYLINDERS AND GAS PRODUCING EQUIPMENT
ACETYLENE · OXYGEN · HYDROGEN · NITROGEN

O'FALLON 5, ILLINOIS

40-Ft Pipe Lengths Made by Texas Mill

FOLLOWING the installation of two huge hydraulic presses, Consolidated Western Steel Corporation's large diameter pipe mill at Orange, Texas, is now producing 40-ft pipe lengths. Since it first went into operation in April, its output has been in 32-ft lengths, 30 in. in diameter. Consolidated is a subsidiary of United States Steel Corp.

One press is a "U-ing" press that weighs 280 tons and exerts a 2,000 ton pressure. The second is an "O-ing" press that weighs 675 tons and has a pressure of 18,000 tons. Twenty-two freight cars were needed to move the massive presses and their auxiliary equipment from the factories to Orange.

The new presses will prepare steel plate for joining into pipe by submerged-arc welders. The flat plate is first crimped in a crimping roll. It then goes to the "U-ing" press to be pressed into a U-shape. The "O-ing" press completes the forming, by pressing the plate into a circular cross-section.

* * *

Pennsalt Celebrates 100 Years in Business

PENNSYLVANIA SALT Manufacturing Co., Philadelphia, had its 100th birthday on September 25 and celebrated accordingly with a week of luncheons, dinner parties and plant tours.

One hundred years ago, five young Philadelphia Quakers went into business with $100,000 in partially borrowed capital, a patent for a process of making alkalies from salt and a plant site over salt deposits near Pittsburgh. Within five years the process had proved a failure and virtually their entire investment seemed lost. But they put up more money and gave it another try.

Today the company these enterprising Quakers founded is one of America's leading basic chemical manufacturers, producing at the rate of $38,000,000 worth of products a year for nearly every industry in the country, including welding.

* * *

Westinghouse Sponsors Materials Handling Conference

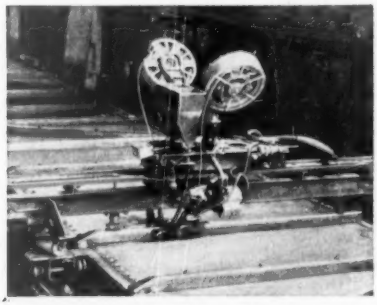
THIRD biennial materials handling conference, sponsored by Westinghouse Electric Corp., will be held in Buffalo on Oct. 24 and 25. The first day's session will be held at the Hotel Statler, and the second day's program will be presented at the Buffalo plant of Westinghouse.

Ideas on Welded Design—For the Engineer's Notebook

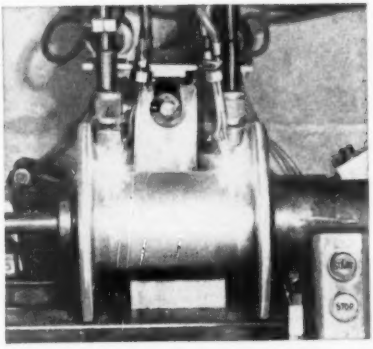
MAKE WELDS SIMULTANEOUSLY

When both ends or both sides of an object must be welded, both welds can often be made simultaneously. Production can thus be doubled — welding time cut in half!

Two UNIONMELT welding heads or two HELIARC torches can often be used — with the weldment turning or moving under stationary welding equipment, or with the welding units moving over the workpiece. Here are examples:



Two UNIONMELT welding heads are simultaneously welding both sides of a stake, joining it to the side panel of a railroad car. The bridge that supports the carriage can be easily shifted for welding both the stakes and diagonal side braces.



Fabrication of aluminum spools is speeded by use of two stationary HELIARC welding torches. The formed ends are joined to the barrel by girth butt welds. The pieces are held together over a backing mandrel, and turned under the HELIARC torches which make both welds simultaneously.

Better design for welding will help cut costs and increase production. For further information, call or write our nearest office.

Visit our booth (1001) at the National Metals Exposition, October 23-27, Chicago, and learn more about these processes. Plan to attend the American Welding Society's special session on "Design for Production Economies," October 24.

THE LINDE AIR PRODUCTS COMPANY

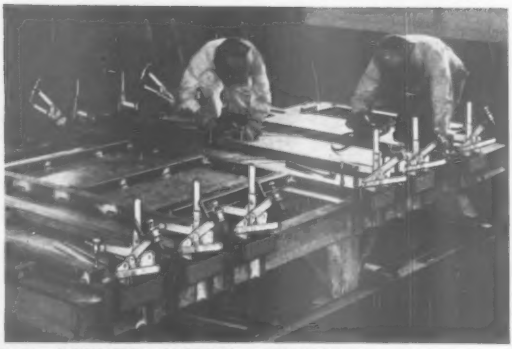
Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York 17, N. Y. Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The terms "Heliarc" and "Unionmelt" are registered trade-marks of The Linde Air Products Company

Production Welders Locate and



HOLD with "DE-STA-CO" clamps

Revised 32-page catalog of toggle clamps, accessories, applications. Template sheets for efficient fixture design.

Precision clamp manufacture and high holding-pressures are the "secret" of this efficient welding fixture. Locating pins welded to clamp bars hold channels in positions to weld variable length assemblies in this versatile fixture. "De-Sta-Co" reamed holes and hardened pins assure accurate positioning of parts. Positive holding pressure forces cross members and plates into close contact essential for strong production welding. And "De-Sta-Co" quick toggle action makes loading a job untrained workers, even women operators, handle with ease, in seconds.

More than forty "De-Sta-Co" models—including new portable and plunger clamps—offer quick solutions to your locating and holding problems. The "De-Sta-Co" stocking distributor in your area is qualified to assist you; call him in, or, if you haven't met him, write for his name and your copy of our catalog, today.

DETROIT STAMPING COMPANY

372 MIDLAND AVE. • DETROIT 3, MICHIGAN

SAVE! TIME AND MONEY

SPEEDY LAYOUT JOBS ON PIPE AND STRUCTURAL STEEL

NOW! NEW EASE AND SPEED WITH THE CONTOUR MARKER

Compact, fits into hip pocket. Efficient, accurate, easy to use. Any of the angles in the illustration to the right can be marked off in five minutes or less on any pipe from 1¼ to 18 inches. Saves time, labor and gas—will pay for itself in one day.

IF YOUR LOCAL DISTRIBUTOR CANNOT SUPPLY YOU CAN ORDER DIRECT.

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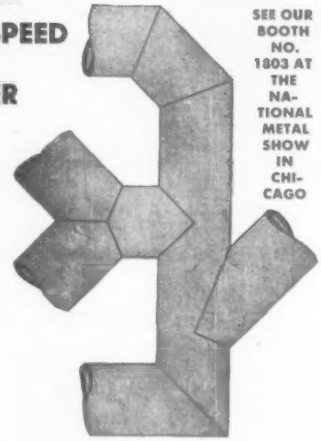
1843 E. Compton Blvd.
Compton, Calif.
Please send me full details on the Contour Marker.

NAME .....
COMPANY .....
STREET .....
CITY .....



SEE OUR BOOTH NO. 1803 AT THE NATIONAL METAL SHOW IN CHICAGO

Western Insulated Wire Moves to New Building

A NEW half-million dollar factory in Los Angeles is being occupied piecemeal by Western Insulated Wire Co. for the manufacture of neoprene-covered welding cable and other products. Already the first 40,000 sq ft of the building have been occupied. The plant will be entirely devoted to making welding cable, asbestos insulated wires and cable and miscellaneous cords, fixtures and communication wires.

Western Insulated Wire was founded 13 years ago and shortly thereafter pioneered the use of neoprene in cable manufacture. Neoprene is said to give the cable exceptional resistance to heat, corrosion, gasoline, ozone and abrasion.

• • •

Reynolds Publishes Book on Aluminum Production

THE complete story of aluminum, from raw bauxite to finished products is told in a new 96-page wire-bound booklet, "The A-B-C's of Aluminum," published by Reynolds Metals Co. The booklet has three sections: "A" for alloys, production and fabrication; "B" for benefits of aluminum and "C" for consumption of aluminum in modern life. It also has a special series of 69 pictures and charts that show all phases of aluminum operations including welding and forming.

A 32-page condensed edition is available to schools, engineering societies, study groups and others desiring quantities for distribution. This has the complete text but not all the illustrations.

For copies, requests must be sent on company letterheads to Reynolds Metals Co., 2500 South Third St., Louisville, 1, Ky.

• • •

H. F. Reinhard Receives Safety Award

A "Certificate of Appreciation" was recently awarded to H. F. Reinhard, manager of the safety code division of The Linde Air Products Co., a subsidiary of the Union Carbide and Carbon Corp.

The certificate was given in recognition of Linde's work in aiding the growth of the Wise Owl Club of America. It was presented by Mason H. Bigelow, president of the National Society for the Prevention of Blindness.

The first Wise Owl chapter in a Union Carbide plant was set up on February 28, 1949. There are now four chapters with a total membership of 88 workers.

FOSTER'S Remote Control Cuts Costs for Detroit Manufacturer

Peters-Dalton, Inc. Saves Labor and Power, Improves Weld Quality

PETERS-DALTON, INC., of Detroit, is a large and progressive fabricator of paint finishing systems and other special equipment. They have long taken pride in the high quality of welding for which they are well known to their many customers.

This company was quick to see the possibilities and advantages of putting complete control of welding machines in the hands of their operators. On many shop jobs material ranges from 16 gauge to 1" plate. On field installation work, operators are a considerable distance from the machines.

Welders were wasting valuable time between work and machines due to so many necessary current changes. Fit-up welders were wasting current with machines running idle so much of the time. With 35 machines in the shop and 40 in the field, this adds up to a sizeable sum of money.

Foster Remote Control has changed all of this.

Figure 1: Benny Polanski is shown working on a three-stage washing machine for small parts. Material ranges from ⅛" to ¼" plate and includes pipe from 1¼" to 4" diameter. Electrodes used run from ⅛" to ¼", some straight and some reversed polarity. Complete job can be done without a single trip to the welding machine.

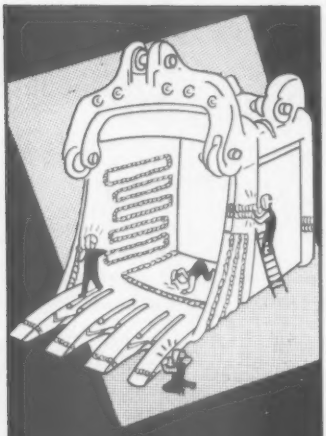
Figure 2: In foreground Art Hill, Shop Superintendent, is explaining complete remote control to Orrville Lenaway, Foreman. Job shown is television tube oven involving material ranging from 16-gauge stainless to 12" I beams. Oven is 26 ft. in diameter and stands 15 ft. high. Foster remote control saves time and power and improves weld quality.

Readers interested in Remote Control for DC Arc Welders are urged to write for booklet to

FOSTER TRANSFORMER COMPANY

3820 COLERAIN AVE. CINCINNATI 23, OHIO

SEE US AT BOOTH 2465 AT THE METALS SHOW



Repair Worn Buckets

with

MANGANAL

U.S. PATS. 1,876,738-1,947,167-2,021,945

11% – 13½%

Manganese-Nickel Steel

. . . the Toughest Metal Known, Not Harmed by Heat!

- MANGANAL speeds repairs . . . practically eliminates build-up welding time.
- BUCKETS economically repaired with MANGANAL products often outlast new ones.
- FITS EVERY REPAIR NEED . . . from MANGANAL Flat Applicator Bars and Hot Rolled Plates for lining buckets . . . to MANGANAL Wedge Bars for worn teeth or lips.
- MANGANAL workhardens to 550 Brinell under impact and abrasion . . . tensile strength up to 150,000 p.s.i.

FREE—Informative literature outlining newest methods for economical bucket repairs. Write Today!

Name of Nearest Distributor on Request!

STULZ-SICKLES CO.

SOLE PRODUCERS

91 N. J. Railroad Ave., Newark 5, N. J.

General Electric Show Train to Head toward Midwest

"MORE POWER TO AMERICA SPECIAL," the ten-car G-E exhibit train of electrical products headed west from Schenectady on Sept. 5. It will stop at 29 midwestern industrial centers this fall before swinging south down the Atlantic coast.

Some 35,000 industrial leaders in the midwest will inspect the train on its midwestern tour, G-E officials estimate. Many of the exhibits they see will have been renovated or replaced to keep the display completely up to date.

Attendance is limited to invited representatives of electric utilities, the manufacturing and transportation industries, the armed services, the federal government and municipalities. The first cities to be visited included Erie, Pa., Cleveland, Toledo, Detroit, Saginaw, Mich., Lansing, Mich., Grand Rapids, Mich., Kalamazoo, Mich., Jackson, Mich., and Ft. Wayne, Ind.

* * *

Orthopedic Surgeons Talked About Welding

WELDING and forging procedures were among the recent technical developments to be discussed at the third annual symposium on orthopedic appliances, held at Mellon Institute, Pittsburgh, the week of Sept. 18. Some 120 orthopedic physicians and surgeons, bracemaking technologists and other workers in the field were invited to attend. Orthopedics is that branch of medical science that deals with the correction or prevention of deformities, especially in children.

* * *

Welded Pipe on Program of SNDT Convention

WHEN the Society for Non-Destructive Testing, Inc., holds its tenth annual convention at Chicago, Oct. 24-26, the program will include several papers of interest to the welding fraternity. One of these is a paper on the magnetic-particle inspection of welded pipe and tubing by Messrs. Clarke, Peterson and Dunsheath of Magnaflux Corp.

Ultrasonic and X-ray testing are also prominent on the program. Dr. L. W. Ball, of Navy Ordnance Laboratory, White Oak, Md., will discuss "sonoscopy" or ultrasonic image visualization. Dr. E. O. Dixon, chief metallurgist of Ladish Co., Cudahy, Wis., will conduct a symposium on ultrasonics.

Other speakers will discuss the use of supervoltage X-rays in industry and radiological defense, including the use of the betatron.

Extremely Comfortable Built for Long Service

Sellstrom No. 243 Welding Helmet

Here is a Welding Helmet designed to meet all Federal Specifications. It is of one-piece construction — made of the familiar tough fibre as used for all Sellstrom Welding Helmets. The Helmet can quickly be adjusted to fit any size head by adjusting the plastic knobs at the back and sides. Held in any desired position by tension springs which are easily adjusted.

For extra comfort it has a specially designed vulcoid headgear, with genuine top grain hatter's leather forehead cushion, held in place by snap fasteners. This, combined with the perfectly balanced hood, largely accounts for its great popularity among welders.

It is fitted with a standard 2" x 4¼" window. A patented and improved lens retainer permits changing lenses from the front. Furnished with or without plates.

See our Catalog No. 27, page 19, for a variety of nine different welding plates each for a special purpose.

This helmet was first offered about three years ago, but the special features, the extremely high quality and the comfortable headgear have made it one of our most popular helmets. Order from your dealer. If he cannot supply you, write us for a sample helmet on memo for "on the job" test purposes.

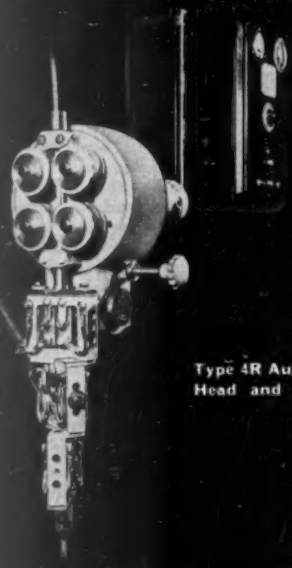
sellstrom

MANUFACTURING COMPANY

More Than 200 Eye and Face Safeguards

626-J N. Aberdeen St., Chicago 22, Ill.

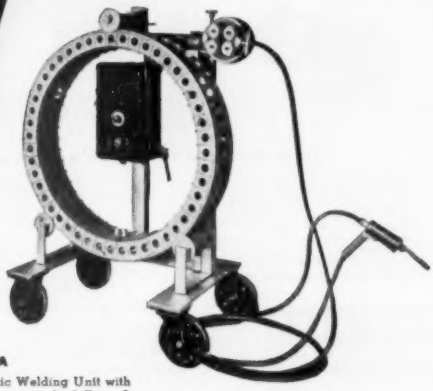
TWO NEW AUTOMATIC ARC WELDING HEADS



Type 4R Automatic Head and Control

THE REID-AVERY AUTOMATIC WELDING HEAD

THE REID-AVERY SEMI AUTOMATIC WELDING UNIT



Race Type SA
Semi Automatic Welding Unit with reel and carriage to feed Type A heavily coated shielded arc wire. Capacity up to 5/32" wire.

TYPE 4R AUTOMATIC HEAD

The most universal welding head on the market today. Can be used with all types of automatic electrodes:—heavily coated shielded arc, lightly coated open arc. Also adaptable for submerged melt welding.

Can be used with any welding machine AC or DC.

The control is a self-contained unit with its own arc contactor for simplified wiring; just connect the welding machine cable to the arc contactor and plug in the control to the lighting circuit.

The head weighs only 38 pounds, has four driven rolls for positive feed without excessive wear or damage to wire coatings and 360° rotation with guide wheel—six mounting positions.

EXTREMELY SIMPLE CONTROL CIRCUIT
NO EXPENSIVE ELECTRON TUBES
NO EXTERNAL EXCITERS

TYPE S.A. SEMI AUTOMATIC WELDING UNIT

For those numerous jobs that do not warrant a full automatic welding fixture the REID-AVERY Type S.A. semi-automatic welding unit is ideal.

Designed to use the same electrodes as the full automatic head. The electrode is fed from the reel through a flexible tube to the welding gun at a rate proportional to the pre-set arc voltage. The operator merely guides the arc along the seam.

Note these advantages:—VISUAL ARC. Higher currents and speeds than are possible with manual electrodes—no craters in long seams—no stub end losses—simplified wiring, just connect the welding cables and plug into the lighting circuit—large rubber tired casters on carriage for portable operation.

Write For Descriptive Bulletin

The REID-AVERY COMPANY
INCORPORATED
DUNDALK • BALTIMORE 22 • MARYLAND

It is the sales policy of The Reid-Avery Company, Inc., to market our products exclusively through distributors and agents. • *Members of* THE AMERICAN WELDING SOCIETY *and* THE NATIONAL WELDING SUPPLY ASSOCIATION

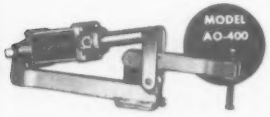
NOW

New air-operated clamps with toggle-bar force

from Feather-touch to **OVER A TON**

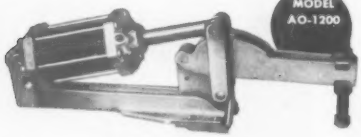
. . . another example of design leadership to provide simultaneous multiple clamping and solve your SPEED-PRODUCTION problems.

PRESSURES
80 to 190 lbs.



PRESSURES
400 to 1050 lbs.

PRESSURES
200 to 475 lbs.



PRESSURES
1200 to 2875 lbs.

Consult us direct or our representative engineer near you

Buffalo, N. Y., J. H. England
Chicago 20, Ill., Larry P. Wood
Columbus, Ohio, Arthur Gangloff
Dallas 2, Texas, C. G. Wilson Co.
Dayton, Ohio, W. F. Grimes
Detroit 2, Michigan, 2906 W. Grand Blvd.
Glendale, Calif., Art Lewis Prod. Equip. Co.
Houston, Texas, L. H. Creasy
Indianapolis, Indiana, E. M. Lewis
Kansas City, Kansas, L. N. Wood
Milwaukee 9, Wisc., K. W. Stoffregen
Minneapolis 4, Minn., Midwest Mach. Tool Supply
New York 17, N. Y., V. A. Chern
Oakland, Calif., Bues Prod. Equip. Co.
Philadelphia, Pa., Jackson-Walter Co.
Seattle, Washington, Norwes Company
St. Louis, Missouri, Moehlenpah Engr. Inc.
Poland, Ohio, P. L. Duer

Send for new folder giving further information

KNU-VISE PRODUCTS

LAPEER MANUFACTURING CO.
3056 DAVISON ROAD • LAPEER, MICHIGAN

Western Division
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Glendale, California

See our Booth No. 2453
National Metal Congress

Canadian Stocking Dist.
Higginson Engr. Sales
P. O. Box 23
Hamilton, Ontario

An Unbeatable Combination!

SILVALOY SILVER BRAZING ALLOYS

The Silvaloy group consists of 7 popular silver brazing alloys high in tensile strength and producing strong, ductile joints on ferrous and non-ferrous metals.

	SILVER CONTENT	MELTING POINT	FLOW POINT
SILVALOY 50	50%	1160 F	1175 F
SILVALOY 45	45%	1125 F	1145 F
SILVALOY 40	40%	1135 F	1205 F
SILVALOY 35	35%	1125 F	1295 F
SILVALOY 20	20%	1430 F	1500 F
SILVALOY 15	15%	1185 F	1280 F
SILVALOY 503	50%	1195 F	1270 F

1200 All-Purpose Flux—for use on all metals. No. 1200 Flux readily dissolves oxides during brazing operations and aids in the flowing of the alloy. Meets all government specifications.

1100 Low Temperature Flux—superior where exceptionally clean surfaces on copper or copper alloys are required at lower temperatures.

COMPLETE STOCKS

Oxy-acetelyne welding rods and flux for cast iron, steel, aluminum, brass, copper, bronze, nickel, monel and inconel.

STEEL SALES
CORPORATION

3348 SOUTH PULASKI ROAD • CHICAGO, ILLINOIS

BRANCH PLANTS: Detroit, St. Louis • **BRANCH OFFICES:** Milwaukee, Minneapolis, Grand Rapids, Indianapolis, Kansas City, Mo.

Coming Ten Years Hopeful, Says McGraw-Hill Report

Good times will keep up for the decade 1950-1960, predicts a recent report by the McGraw-Hill Department of Economics, if we have no all-out world war nor broad-scale depression.

If ten years from now we are enjoying a year of reasonably full employment such as in 1950, the total national output will be $315 billion of goods and services, 18% more than in 1950. Business capital expenditures will be about $25 billion, compared to $21 billion in 1950. Consumer expenditures are expected to be more than $220 billion, some $35 billion more than now. These dollar estimates, it should be noted, are all based on the buying power of 1950 dollars.

Population growth is one reason why McGraw-Hill forecaster Dexter M. Keezer predicts so optimistically. This is a key force making for an expanding economy. An expanding populace needs an increasing flow of goods and services. Since 1940, the population has grown more than in any previous decade due to early marriages, more children and greater security for most families. Medical advances have also greatly extended the life span.

The total labor force in 1960 may be as high as 65.5 million; nevertheless, it won't show a rise in proportion to the total population. There will be fewer new male workers, but more women in industry. In 1960 the average worker will spend only 38 hours a week on the job, compared to today's average of 41 hours.

The shorter work week is expected to be overbalanced by rising productivity, the second great growth-force in an expanding economy. New methods and new machines constantly multiply the effectiveness of each worker. With the steady increase in industrial research, development of efficient equipment should move fast during the 50's.

To determine how fast productivity will rise, it is necessary to know how much money will be invested in installing better equipment and how vigorously those using it will apply their skill and energy. These two questions are tied with the political and social atmosphere of the times.

Broadly, both Republicans and Democrats are today expansionists; both want maximum employment for our expanding labor force. Both support a large allocation of resources for the defense and economic development of the free world.

However, many political positions and attitudes work against expan-

sion. Corporate profits are often milked by excessive taxation, although business depends primarily on profits to pay for new equipment. Neither is the attitude of many labor groups constructive; they strive to grab a larger share of the present dollar instead of to increase the total production and so their own incomes. No speedy change in either of these shortsighted attitudes is likely at present.

The increases in national output, capital expenditures and consumer expenditures mentioned above are based on the hope that the economy will improve at a conservative 1.7% per year. With wise governing policies and energy and foresight on the part of business management and labor, the increases should be much greater.

The electric power industry has tremendous growth ahead. The editors of *Electrical World* expect industrial power sales to rise 60% and residential sales to more than double by 1960.

In the metalworking fields, some industries will grow fast, while others will lag. Automobiles, trucks, railway equipment, office machinery, agricultural machinery, construction machinery and special machinery should all show growth.

Metal mining will show great gains in the production of light metals, aluminum, magnesium and titanium. High-grade ore deposits of the old standbys, copper and iron, are limited, and new uses of the light metals are coming to light every day. Titanium shows great promise for the automotive and airplane fields because of its good strength-to-weight ratio.

In the construction industry, expenditures may reach 25% above 1950, though the emphasis will shift away from housing to more stores, schools, hospitals, etc.

The report indicates only the growth potential of the United States economy and is not a forecast of what is actually going to happen. There is nothing automatic about attainment of the growth that is possible. Failure to do short range planning successfully might well ruin longer-range potentials.

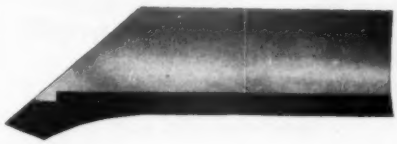
* * *

New Welding Supplier Incorporates at Lima, O.

EDWARD M. BROWN, of Van Wert, O., Harold A. Tatler and Edward E. Paxson, of Lima, O., have incorporated the Lima Welders Supply Co. for the manufacture and handling of welding equipment, accessories and supplies.

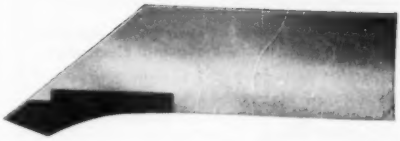
Osmundson **"WELD-ON"**

No Forge Fire Required • Electric Welding Construction Throughout



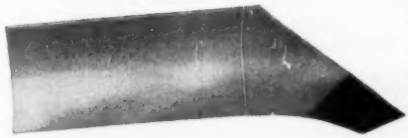
OSMUNDSON'S NEW NO. 11 ONE PIECE WELD ON PLOW EDGE . . .

To properly repair your worn out regular plow share, Osmundson's new No. 11 one-piece plow edge for longer life and better plow share performance. This new No. 11 one-piece plow edge is available in both Hi-Carbon and soft center steel.



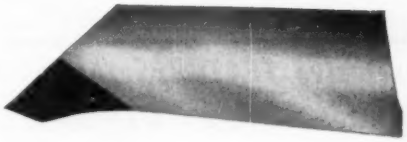
OSMUNDSON'S NEW NO. 7 WELD ON POINT AND THROAT

When your plow share needs a point and throat, use Osmundson's new No. 7 drop forged point and throat. This giving you more strength and a better proportioned plow share. Available in both Hi-Carbon and soft center steel.



OSMUNDSON'S NO. 8 & NO. 10 DROP FORGED POINTS

When the nose on your regular plow share is worn and will not stay in the ground, use one of Osmundson's No. 8 or 10 size points. One of these sizes will give you the required plow share point length. No. 8 and No. 10 available in both solid steel and soft center. No. 8 and 10 solid steel points available in right and left hand.

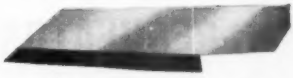


OSMUNDSON'S NEW NO. 9 WELD ON ALFALFA PLOW SHARE POINT

When the nose on your alfalfa plow share is worn and will not stay in the ground, use Osmundson's new No. 9 drop forged point to maintain longer life and new plow share performance.

CURVED PLANTER RUNNER EDGES

Osmundson's new double beveled curved planter runner edges are made of the finest Hi-Carbon steel to give your planter runner shoe longer life, and new proportions.



STUB PLANTER RUNNER EDGES

Osmundson's new double beveled stub planter runner edges are made of the finest Hi-Carbon steel to give your planter runner shoe longer life and new proportions.

HEEL PATCHES, HI-CARBON

Apply Osmundsons' heel patches to avoid scattering of corn and maintain more wear. Available in straight or V pieces.

CULTIVATOR SHOVEL POINTS

For new point length on worn cultivator shovels, apply Osmundson's Quick Weld Points. Available in Hi-Carbon and soft center steel.

LISTER POINTS

Osmundson's lister points will repair your lister like new. Available in both Hi-Carbon and soft center steel.

THE NEW NO. 11 ONE PIECE WELD ON EDGE CAN BE APPLIED WITHOUT THE USE OF A FORGE

OSMUNDSON SPADE MFG. CO. PERRY, IOWA

Fuse-Well

CAST IRON RODS and ELECTRODES

SOLD THRU LEADING DISTRIBUTORS

- Square "Fuse-Well" No. 11 (Cast Iron Gas Welding Rod)
- Square "Fuse-Well" No. 14 (Moly Hi-Strength Rod)
- Square "Fuse-Well" No. 16 (Hard-Surfacing Rod)
- Round "Fuse-Well" No. 19 (Hard-Surfacing Electrode)
- Round "Fuse-Well" No. 22 (Machineable Coated Electrode)

"FLUX-WELL" WELDING FLUXES

Fuse-Well Cast Welding Rods

"FUSE-WELL" CAST ALUMINUM WELDING RODS

THE CHICAGO HARDWARE FOUNDRY CO.

"Dependable Since 1897"

20100 Commonwealth Ave. NORTH CHICAGO, ILLINOIS

DESIGN with exclusive FEATURES that PAY OFF...

OXO WELDING EQUIPMENT CO. TRADE MARK

OXO WELDING AND CUTTING REGULATORS

- Protected Gauges
- All working parts of Stainless Steel
- Nozzle, Seat and Filter incorporated as one unit
- Built-in Check Shock
- Stainless Micro Filter
- Only one size socket wrench necessary to effect complete change of working parts

SENSITIVITY • SIMPLICITY
LONG LIFE • ECONOMY
SAFETY
Write for Details

Shock and rough handling will not impair its dependable performance. Stays in service longer—most economical to maintain.

UNDERWRITERS LABORATORIES APPROVED

OXO WELDING EQUIPMENT CO.
1235 WEST 95th ST. CHICAGO 43, ILL.

J. F. Wagner to Visit European Gas Plants

J. F. ("JOE") WAGNER, vice-president of the Burdett Oxygen Co., Cleveland, sailed for Europe on Aug. 30 to study new developments in the gas industry in England and on the continent. He is one of a four-man commission selected by the Independent Oxygen Manufacturers Association to take the trip. They will visit England, France, Germany, Italy, Switzerland, Belgium, Sweden and Denmark. The commission represents all the independent oxygen manufacturers.

Mr. Wagner is a past president of the Independent Oxygen Manufacturers Association and chairman of the atmospheric gases and hydrogen committee of the Compressed Gas Association. Decision to send the commission abroad was made at the summer meeting of the IOMA, held recently at Banff, Canada.

* * *

Three Ships Take 29 Miles of Tubing

BABCOCK AND WILCOX Tube Co., Beaver Falls, Pa., plant, is busy with an order for more than 29 miles of boiler tubing. The 211 tons of seamless steel tubing (hot-finished and cold drawn) will go into the boilers of three new round-the-world liners of the American President Lines. There will be two boilers in each ship to supply the 107,000 pounds of steam per hour required to drive the vessels at a cruising speed of 19 knots.

The boilers are said to have all efficiencies of land-based boilers of the same capacity but occupy only one-third the space.

* * *

Castings Story Told on Portable Panels

A NOVEL educational method is being used by the Steel Founders' Society of America, Cleveland, to carry the story of steel castings to student groups in 128 engineering colleges. Basic information is dramatized on 4 by 6 ft. panels operated electrically to flash sequences of colored photographic slides. Each series features typical casting applications.

* * *

$250,000 Order for Resistance Welders

THE Federal Machine and Welder Co., Warren, O., has received an order for welding equipment totaling $250,000 from the Standard Steel Spring Co. The welders will be installed at the company's two plants at Los Angeles and Roebling, N. J.

RWMA Moves to a New Philadelphia Address

RESISTANCE Welder Manufacturers' Association moved last month to a new address at 1900 Arch St., Philadelphia 3. New telephone number of the association will be LOcust 4-3484. The move was necessitated by a project involving the demolishing of three city blocks in front of Independence Hall in Philadelphia, in the area in which the former RWMA quarters were located.

* * *

Harnischfeger Corp. Opens Two New Offices

A NEW branch office in Syracuse, N. Y., has been opened by Harnischfeger Corporation, Milwaukee, to sell welders, excavators, cranes, hoists, electrodes and Diesel engines. J. F. Catalane has been appointed district manager of the territory, which covers upper New York west and north of Sullivan, Ulster and Dutchess counties.

A sales office has been opened by Harnischfeger in Cincinnati to handle hoists and cranes. W. T. Spelius heads the new office, which is under the jurisdiction of the company's Pittsburgh branch office.

* * *

Sauveur Award to Go to Battelle Man

THIS YEAR'S Sauveur Achievement Award will be given to Clarence E. Sims, assistant director at Battelle Memorial Institute, Columbus, O. It will be in recognition of his pioneering studies and sound research into the origin and effects of inclusions in cast steels. Dr. Sims is the author or co-author of more than 50 technical publications on such subjects as welding problems, nonmetallic inclusions, deoxidation, gases in metal and ferrous metallurgy.

The award was established in 1934 by the American Society for Metals.

* * *

Thomas Named President of N-D Testing Society

W. E. THOMAS, of Magnaflux Corp., Chicago, has been named as president of the Society for Non-Destructive Testing for the 1950-1951 term by the Society's 1949-1950 nominating committee. Other new officers selected are:

Vice-president: Noah A. Kahn, U. S. Naval Shipyard, Brooklyn; treasurer: Dr. Robert C. McMaster, Battelle Memorial Institute, Columbus, O.; directors: Dr. Gerold H. Tenney, U. S. Atomic Energy Commission, Los Alamos; W. Hitt, Douglas Aircraft Co., Inc., Los Angeles.

COST-SAVING, HEAVY DUTY GASTON GRINDERS Increase Production!

High speed, perfectly balanced Gaston portable grinders give long, trouble-free service — return their original investment in a matter of months through savings in maintenance, power costs and labor.

HEAVY DUTY DISC GRINDERS

Power source is patented dust-free 3-phase type motor with indestructible rotor and large, superior quality bearings. No gears or brushes that require constant maintenance. 230 volt, 3-phase, 60 cycle, 3400 rpm — from ⅝ to 2 hp ratings. Complete with 20 ft. 4-conductor #16 heavy duty rubber covered cord.

EDGE GRINDERS

3400 rpm, 3-phase, 60 cycle, 230 volt Edge Grinders in ratings from ⅝ to 2 hp. Constant wheel speed gives operator high production rate. 20 ft. heavy duty cord included.

STAINLESS STEEL POLISHER

750 rpm, 3-phase, 60 cycle, 230 volt Polisher with special arbor for buffs. Includes 20 ft. heavy duty rubber covered cord. Buffs extra.

THERMAL OVERLOAD CUT-OUT

Recommended for each grinder to insure long life and permit the operator to maintain high efficiency by warning of excessive loads. Attaches to end of cord at outlet.

Manufacturers' Representatives and Jobbers:

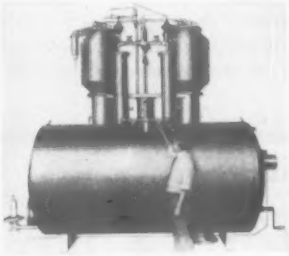
A few good territories still available. Give full details in your first letter.

Write today for Free Bulletin No. G-950 on Grinders and Accessories.

GASTON POWER TOOLS, INC.

14829 LOOMIS STREET **HARVEY, ILLINOIS**

FOR BIG PRODUCTION OF ACETYLENE AT AN AMAZINGLY LOW COST



Sight Feed

MODEL A-TWIN

CONTINUOUS FLOW

ACETYLENE GENERATOR

- Here's ECONOMY in capital letters. Produce your own acetylene at a savings of 50% or more of the cost of cylinder acetylene.
- No shutting down for re-charging. The Model A-Twin automatically produces a continuous flow of the purest, hottest acetylene obtainable. Simple in operation.
- Manufactured in five sizes, producing from 500 to 2,400 cu. ft. of acetylene per hour.

See your Distributor or write for full information. Also, ask about

SIGHT FEED ACETYLENE FILLING PLANTS

COMPLETE IN EVERY DETAIL.

THE SIGHT FEED GENERATOR COMPANY

West Alexandria, Ohio, U. S. A.

"Spiratube" Made in a New Factory

FLEXIBLE Tubing Corp., manufacturer of "Spiratube" for ventilation and other uses, will move from Branford, Conn., to a new 13,000-sq.-ft. plant at Guilford, Conn. The move is scheduled to be accomplished on Nov. 15. Spiratube was war-born as a retractable ventilating tubing for the Navy. It has been adapted to many other uses, including the removal of welding fumes.

* * *

Steel Up 7%

OPERATING rate of the steel industry was scheduled at 97.1% capacity for the week beginning Aug. 28, 1950. This is equivalent to 1,872,800 tons of steel ingots and castings. It compares to 1,747,400 tons for the week immediately previous, 1,591,000 tons for the comparable week of a year ago, and 1,281,210 tons for the average week in 1940, the highest prewar year.

* * *

Bastian-Blessing to Add to Present Plant Area

Two new one-story additions will provide an additional 21,000 sq ft of floor space at the Bastian-Blessing Co. plant at 4201 West Peterson Ave., Chicago. Construction has already been started on the first addition, a 42 by 90 ft wing for the Rego engineering department.

The second addition will be a 60 by 300 ft structure west of the present plant. With completion of these two extensions, the Bastian-Blessing plant will occupy nearly six acres of floor space.

* * *

All-State Improves Package Design

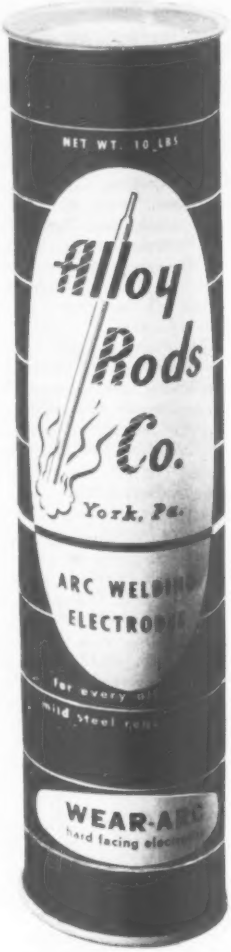
USE OF HIGH-STRENGTH corrugated cartons is the third major improvement in package design and construction to be made by the All-State Welding Alloys Co., White Plains, N. Y. The company's welding rods (both bare and flux-coated) are now being packaged in standard 5-lb. and 10-lb. packages of square cross-section, to replace previous fibreboard boxes and tubes. Four thicknesses of board at the end enable the package to be tossed about and otherwise abused without spilling its contents. The label includes general instructions for welding, brazing and soldering as well as specific instructions for applying the particular rod in the package. Identification, size and quantity are repeated on the end of the box as a convenience to the storekeeper.

The Quality Line

in the

STEEL CONTAINER

Moisture, dirt and grease proof . . . Easy to stock convenient 10 lb. size.



WEAR-ARC

HARD FACING ARC WELDING ELECTRODES

For fast, economical, efficient rebuilding and hard-facing to resist abrasion, impact, compression, corrosion and heat. Seven basic electrodes for correcting specific wear patterns. Ask for bulletin 10550. Alloy Rods Company, York, Penna.

About People

DAVID H. WILSON has joined the All-State Welding Alloys Co., Inc., White Plains, N. Y., as middle west regional manager. He will supervise All-State sales and service throughout North and South Dakota, Nebraska, Iowa, Minnesota, Wisconsin, Illinois, Michigan and Indiana, making his headquarters at 1079 Burns Ave., St. Paul 6. Mr. Wilson was previously a welding instructor at Dunwoody Institute, Minneapolis.

* * *

J. J. BOHMRICH, former manager of the product service division of A. O. Smith Corp., Milwaukee, has been named group executive over the product service, railroad products and welding electrode and equipment divisions. J. W. SPOOR replaces Mr. Bohmrich as manager of product service, and he will also direct operations of the Chicago products service branch. E. R. DICKINSON, who has been manager of the Chicago branch, is being transferred to the Eastern branch at Union, N. J., as manager. He succeeds C. L. TRACEY, who is moving to the New York District office.

* * *

At the A. O. Smith Dallas branch, J. A. SNYDER, JR., has been named manager to succeed D. R. NEFF, resigned.

* * *

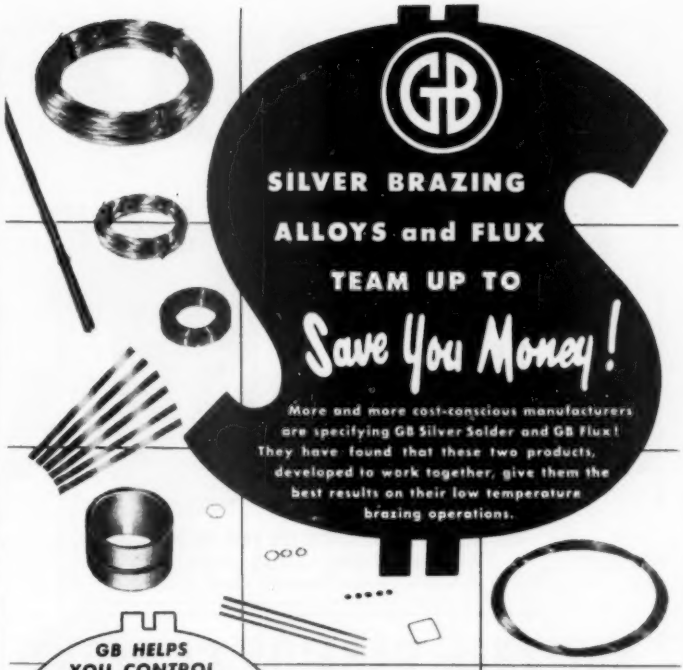
JOHN A. DECKER has been appointed sales manager for the New York district of the Carborundum Co., Niagara Falls, N. Y. WILLIAM J. KINGSLEY has been made assistant sales manager of the bonded products and grain division.

* * *

E. D. (PAT) CASSEDAY has been appointed district manager of Bridgeport Brass Co. at the Houston, Tex., office to succeed GEORGE CHATNEUFF.

* * *

P. C. PETRY has been transferred from the Milwaukee office of Harnischfeger Corporation to the Philadelphia branch, where he will handle the full line of P&H welding equipment. A. L. STANLEY has been named district manager of the Harnischfeger Minneapolis territory. K. J. SPLUDE recently joined the sales staff of the St. Louis office of Harnischfeger. WILLIAM H. DE HUFF recently became excavator sales representative in the Chicago office of Harnischfeger.


GB
SILVER BRAZING
ALLOYS and FLUX
TEAM UP TO
Save You Money!
More and more cost-conscious manufacturers are specifying GB Silver Solder and GB Flux! They have found that these two products, developed to work together, give them the best results on their low temperature brazing operations.

GB HELPS YOU CONTROL THESE COST FACTORS!

SPEED
HEATING
MATERIAL
LABOR
CLEANING
FIT-UP
PREPARATION

GB Silver Solders are available in six standard alloys—each developed to meet specific cost and production requirements. All are available in the most convenient form to meet your needs — wire coils or straight lengths, strips, sheets or formed pieces.

GB No. 50 Silver Solder, melting range 1160-1175°F
GB No. 50N Silver Solder, melting range 1240-1260°F
GB No. 45 Silver Solder, melting range 1125-1145°F
GB No. 41 Silver Solder, melting range 1125-1160°F
GB No. 35 Silver Solder, melting range 1130-1270°F
GB No. 31 Silver Solder, melting range 1130-1300°F

And, if you require a special Silver Solder, Goldsmith's Technical Service Division is ready to give you competent assistance — their recommendations will be backed by 80 years of experience in alloying and refining precious metals.

GB FLUXES

Produced under strict laboratory control, GB Fluxes are fully active, deep penetrating, stable and economical. While developed primarily for use with GB Silver Solders, they produce high quality joints with any good silver solder.

GB DATA BOOK

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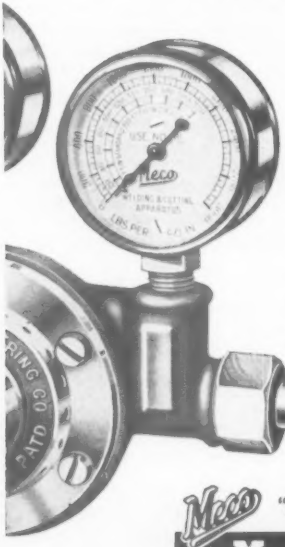
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EDWARD A. GREEN has been appointed staff assistant to A. W. Bartling, general sales manager of General Electric's Small Apparatus Divisions with headquarters at Lynn, Mass. He will assist in sales of welding equipment, controls, fractional-horsepower motors, industrial heating, lighting and rectifiers, and other products in the small apparatus group. His job as manager of sales of the control divisions will be taken by L. DEAN FOWLER.

* * *

ALFRED D. JENSS has been appointed district manager of the Cincinnati office of Ampco Metal, Inc. For the past several years he has been a field engineer working out of the Ampco Milwaukee office.

* * *

GEORGE M. WORDEN, formerly publicity manager and publication editor for Air Reduction Co., Inc., has joined the staff of Hill and Knowlton, Inc., public relations firm.

* * *

RICHARD A. WEPPNER has been appointed sales engineer for The Atlas Mineral Products Co., Mertztown, Pa., in the states of Delaware, Maryland, Virginia and parts of West Virginia and New Jersey. PHILIP E. BERENS has been appointed salesman for eastern Pennsylvania, western New York and parts of New Jersey. WILLIAM A. STREAKER has been named salesman for the lower peninsula of Michigan, eastern Indiana and Lucas county in Ohio.

* * *

DR. HOLGER C. ANDERSON, formerly research and development director for Hastings and Co., Philadelphia, and LAWRENCE J. READER, formerly senior inorganic research chemist with General Chemical Co. and Wyandotte Chemical Corp., have joined the staff of the research laboratories of Foote Mineral Co., Philadelphia. L. H. BELZ and HARVEY STEWART, JR. also have been added to the Foote research and development staff.

* * *

MALVERN J. GROSS, formerly vice-president in charge of engineering of the General Electric X-Ray Corp., has been appointed administrative assistant to Dr. Kenneth H. Kingdon, technical manager of the Knolls Atomic Power Laboratory at Schenectady. General Electric Co. operates the laboratory for the U. S. Atomic Energy Commission.

* * *

W. J. BINDER has been appointed as manager of the engineering service department of A. M. Byers Co., Pittsburgh.

30 YEARS AGO

(From THE WELDING ENGINEER of October, 1920)

A New York City section of the American Welding Society will be organized at a meeting on Oct. 14, 1920, at the Engineering Societies Building. Other sections have been organized in Philadelphia, Chicago and Pittsburgh.

—30 YEARS AGO—

GROWING demand from blacksmiths for oxyacetylene welding outfits is reported by the Oxweld Acetylene Company. To keep their reputation of being able to "fix" anything in the village, they must learn to weld. Oxweld says that blacksmiths are the quickest of all mechanics to learn good welding and cutting methods because of their previous experience with metal working flames.

—30 YEARS AGO—

FIRST oxygen plant in Cuba has been erected by the Cuban Air Products Corporation. Largest users of oxygen in Cuba are the railroads and sugar mills with ship repair firms and boiler shops close behind. One job shop is run by a Cuban native who saw his first welding torch being used to raise the battleship *U.S.S. Maine* in Havana harbor.

—30 YEARS AGO—

WILLSON GOGGLES, INC., Reading, Pa., recently celebrated 50 years in business as a goggle manufacturer. The firm was started in 1870 as a "spectacle factory" under the name of T. A. Willson & Co.

—30 YEARS AGO—

GAS WELDING of bonds in railway track signal circuits is advocated in an article in this month's issue of THE WELDING ENGINEER. The author, E. W. Kolb, a signal engineer for the Buffalo, Rochester & Pittsburgh Railroad, says welding solves many circuit difficulties.

—30 YEARS AGO—

NINE barges equipped with arc welding and metal chipping outfits are advertised for harbor repair jobs in this issue of THE WELDING ENGINEER.

—30 YEARS AGO—

PLANS for the reorganization of the American Bureau of Welding have been proposed by Dr. Comfort A. Adams, director of the bureau. It is suggested that the bureau be organized as the welding research advisory committee of the American Welding Society and also of the Engineering Division of the National Research Council.

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★ OXY-ACETYLENE CUTTING AND WELDING APPARATUS
★ GAS REGULATORS
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Originally established in 1907, the Milburn brand identifies the finest in gas cutting and welding apparatus. Under the guidance of the men who made the name of Milburn famous, Alexander Milburn, Inc. is ready to supply you with the most modern gas cutting and welding apparatus, portable carbide lights and regulators for oxygen, acetylene and other gases. When you buy new apparatus, accessories or supplies, specify, and be sure you get, the *Milburn* brand.

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When a touch on a button moves weldments like these into the correct, most convenient position for a downhand pass, you get more arc time, more welding at lower cost. C-F power operated Positioners rotate the work in a full circle at any point in a range of 135° from the horizontal — giving welders a choice of an infinite number of downhand welding positions instantly.

Every requirement for faster, better positioned welding — constant or variable speed table rotation, full 135° tilt, self-locking gearing which holds the table in any position, oversize built-in main tilt and rotating bearings, choice of two base styles, and many other features — are built into C-F Positioners.

C-F Positioners are available in Hand or Power operated models, and are made in capacities up to 30,000 lbs. and larger.

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C-F positioned welds mean better, more economical welds

Book Reviews

Resistance Welding

RESISTANCE WELDING DESIGN, TOOLING AND APPLICATIONS. By Wallace A. Stanley. Published by McGraw-Hill Book Co., New York, 1950. Cloth, 8½ x 11 in., 329 pages. Price $7.50.

The readers of THE WELDING ENGINEER received a preview of this excellent book in the January and February issues of 1950, which presented a condensed version of Chapter 8.

The book, taken in its entirety, presents a wealth of valuable shop and tooling "know-how" that can be applied in the planning and developing of products for resistance welding. Aided by 792 photographs and line drawings, there is presented a clear-cut picture of the steps necessary to design for spot welding, projection welding, seam welding and flash-butt welding. The discussion covers tooling, handling and material controls for various operations as well as methods and procedure.

This book will also prove to be a valuable reference of practical information and process data reflecting the best practice in the field. It is a must for those who use resistance welding in any of its forms.

* * *

Arc Welding

ARC WELDING LESSONS FOR SCHOOL AND FARM SHOP. By Harold L. Kugler. Published by the James F. Lincoln Arc Welding Foundation, Cleveland, 1950. Simulated leather, 5½ x 8½ in., 343 pages. Price $1.

This volume, while written primarily for use in vocational agricultural shop mechanics classes, is well suited for use in shops on the farm. The data are presented in three parts:

Part 1 consists of eight informational lessons providing general data on arc welding. The lessons may be studied separately to become familiar with one particular subject. Each lesson has a class outline, which gives the lesson objective and suggests teaching technique.

Part 2 covers all operational subjects striking the arc, running flat bead butt welding in the flat position, welding overhead, the welding of various metals and similar data.

Part 3, on welded projects, suggests 75 such projects that might be undertaken in the class room or on the farm.

AWS Codes

RECOMMENDED PRACTICES FOR METALLIZING. Published by American Welding Society, New York, 1950. Paper, 6 x 9 in., 22 pages. Price 75c.

A two-part standard, covering all methods of surface preparation, metal-spraying procedures and finishing of sprayed metal shafts or similar objects. Safety recommendations for metallizing are also detailed.

Tables provide information on: depth of undercut for different classes of service and different sizes of shaft; weights and other properties of wire used for spraying; suggested machine settings for the electric bond method of surface preparation. There is also a formula for computing the rate of spraying.

* * *

RECOMMENDED PRACTICES FOR RESISTANCE WELDING. Published by American Welding Society, New York, 1950. Paper, 6 x 9 in., 60 pages. Price $1.

This new edition represents a modification and expansion of a standard originally issued in 1946. Its welding schedules for spot and seam welding cover mild and medium carbon steels, low-alloy steels, stainless steels, nickel, Monel, Inconel and magnesium alloys.

Recommended practices for projection welding cover low-carbon and stainless steels. Flash welding data are provided for steels of low and medium forging strength.

The section on methods of testing resistance welds includes the new peel test and an expanded discussion of the control of resistance weld quality by statistical methods.

* * *

RECOMMENDED PRACTICES FOR SALVAGING AUTOMOTIVE GRAY-IRON CASTINGS BY WELDING (Tentative). Published by American Welding Society, New York, 1950. Paper, 6 x 9 in., 19 pages. Price 50c.

The increase in the use of welding, as an economical means of repairing gray-iron castings, led to a study of the repair methods used in the automotive industry. However, the information presented in this standard should be equally helpful in establishing repair methods for other types of gray-iron castings.

Data presented cover oxyacetylene and shielded metal-arc welding (with and without preheat and stress relief), braze welding, brazing, soft soldering. Metallizing and the use of mechanical methods are also discussed.

See This Torch in Operation
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Ingenious New SMITH "FLO-TROL" eliminates seat burn-out

NO MORE BURNED OUT CUTTING VALVE SEATS

NO MORE COSTLY DELAYS

CARELESS OR INEXPERIENCED OPERATORS CANNOT HARM SEAT IN THIS NEW SMITH TORCH!

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- Special new design permits rotating welding tip in any direction even while flame is burning!
- No WRENCH needed. Finger-tip pressure on nut makes gas-tight seal.
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"FLO-TROL," an exclusive Smith feature, absolutely prevents reverse flow of acetylene to cutting valve seat area, thus eliminating danger of pre-mixing and pre-ignition. You can't go wrong. It's fool-proof. Take advantage of this technical achievement to reduce maintenance costs and eliminate production delays. This new Smith Torch with built-in protection really stays on the job . . . keeps production schedules rolling.

Equipment illustrated is Smith's LIFELONG Welding Torch Body with LIFELONG Cutting Assembly. Rugged and full size for general repair maintenance and manufacturing. Complete line of welding tips and special purpose tips is available with this model.

Smith's MIDLINE Welding & Cutting Equipment

Medium size and medium weight. Designed for production work and garage trade.

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Feather weight and small size. Ideal for light production, aircraft, body and fender work.

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Square tube notched to fit square pipe

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"T" notch on end of Tubular member

Pipe notched with deep slot

"T" joint on tube or pipe

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• ARC-FIT . . . a patented precision-built shearing tool which prepares the ends of tubing or pipe to produce welded or brazed tubular "T" or angle joints. No sawing, cutting, or removing sections with milling cutter. . . . ARC-FIT WILL NOT DEFORM THE TUBE OR PIPE and no further finishing is required. One company reports, "In an assembly of 6 pieces of 1½" standard pipe with 12 cuts the direct labor preparatory cost was $1.12. . . . ARC-FIT reduced this to $.30." ARC-FIT is manual or power operated and fits the ARC-FIT hand press or any standard power press.

ARC-FIT is the complete answer to the many problems confronting the large manufacturer or the small shop owner . . . no matter how small, every shop can AFFORD to have an ARC-FIT. Our literature gives many fine points on operation, construction, and application—send for it today. . . . Write for quotations

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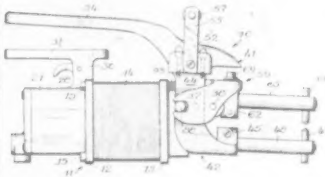
CHICAGO 47, ILLINOIS

From the Patent Office

Portable Spot Welder

2,517,653. RALPH M. GASTON, Chicago. Assigned by mesne assignments to Karma Mfg. Co., Harvey, Ill. Filed May 3, 1949. Granted Aug. 8, 1950.



Patent refers to a portable spot welder having a support member with an extending section that has offset bearing faces. A pair of electrode holders are mounted on levers that are independently pivoted on the offset bearing faces. Detent means interconnect the levers so that when one is rocked about its pivot in one direction, the other pivots in the same direction, but to a different angular extent. Therefore, the electrodes move toward or away from each other, depending on the direction of movement.

* * *

Fluted R-W Electrode

2,513,323. FRANZ R. HENSEL, EARL I. LARSEN and EDMAN F. HOLT, Indianapolis, Ind. Assigned to P. R. Mallory & Co., Inc., Indianapolis, Ind. Filed June 3, 1947. Granted July 4, 1950.

A recently patented design for a spot welding electrode calls for an elongated body extruded from a single piece of metal that can be clamped in a holder at one end. Other end of the body touches the work. A coolant hole goes through the body from the clamped end almost to the contact surface. There is a shallow depression in the center of the bottom surface of the coolant hole. A number of longitudinal flutes are on the inner side of the coolant hole converging towards the depression in the bottom.

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HOBART "10"

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Hobart 10 is the newest development in the E-6010 class electrode. It is a heavy coated electrode designed for welding in any position —is one of the most versatile of electrodes, applicable to most any industrial use.

Overhead weld in ⅜-in plate welded with Hobart No. 10 electrodes.

The arc action is smooth, free, and fast flowing providing good penetration, easy welding, and freedom from porosity. The electrode coating produces a thin, brittle slag which is easy to remove from the weld.

Vertical fillet weld in ⅜-in plate welded upward with Hobart No. 10

The welds have a high tensile strength and ductility with good bead appearance and correct profile.

The 10 electrodes are widely used in structural work, ship building, pipe line construction, fabrication of storage tanks, etc. The penetrating arc is particularly suited to the welding of galvanized plates.

HOBART BROTHERS COMPANY

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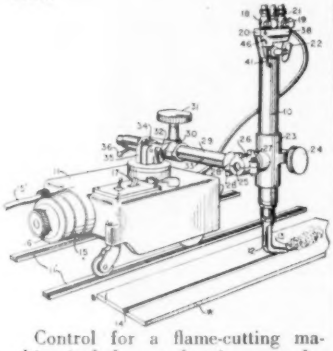
"One of the world's largest builders of arc welders"

Simplify all your welding by using **HOBART ELECTRODES**

Control for Cutting Torch

2,515,302. Howard G. Hughey, Fanwood, N. J. Assigned to Air Reduction Co., Inc., New York City. Filed Aug. 27, 1947. Granted July 18, 1950.

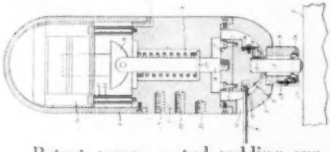


Control for a flame-cutting machine includes an electric motor for moving the torch over the workpiece. Cutting oxygen tubes go to the torch. Fluid-operated means associated with the torch are responsive to the pressure of the cutting oxygen and are connected to a circuit breaker. When the oxygen pressure falls to or below a predetermined value, the motor is stopped.

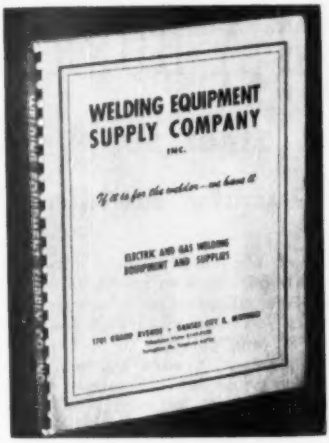
* * *

Stud Welding Gun

2,510,620. Kenneth C. Craven, Fitchburg, Mass. Assigned to General Electric Co., Schenectady, N. Y. Filed Sept. 10, 1949. Granted June 6, 1950.



Patent covers a stud welding gun having a cylindrical body section, a domed cover and a domed nose section removably attached to the body. A tube goes into the nose section. A solenoid provided with a plunger is mounted upon the body section. A rod with a flange slidably mounted in the body section is pivotally attached to the solenoid plunger. A spring holds the plunger away from the solenoid. An adapter is mounted on the rod. An electrically conductive stud holder is mounted upon and insulated from the adapter. The stud holder has a cylindrical space around which a number of spring-held ball retainers are mounted. The retainers grasp the stud to be welded. A number of spring held retainers around the tubular section grasp the ceramic ring used to shield the base of the welding stud.



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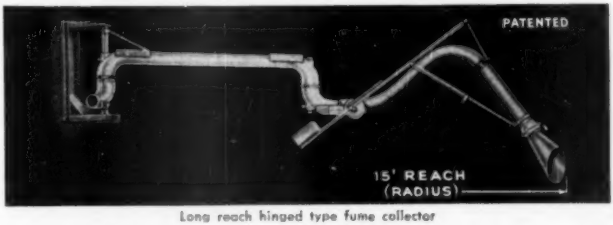
Portable models also available. Write for Fume Collector Bulletin 37-D.



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We guarantee our newly developed formula to produce a superior quality, perfectly balanced flux—and to fulfil all requirements on all types of silver solder brazing jobs.

- Does not crystallize in container
- Eliminates oxidation entirely from surfaces to be joined
- Mixes immediately with water
- Emits a soft green flame
- Suitable for high or low temperature brazing jobs.
- Meets U. S. Navy Spec. No. 51F4a

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produces strong, ductile, leak-proof bonds that will stand up under most severe vibration or temperature changes. Economical—fast working—greatly reduced rejects! Works on all ferrous, non-ferrous or dissimilar metals.

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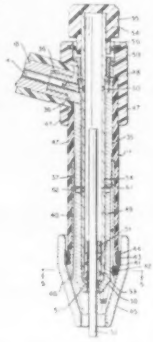
1607 Ohio Ave. Box 1000 Anderson, Indiana

Inert Arc Torch

2,512,707. NELSON E. ANDERSON, Scotch Plains, N. J. Assigned to Air Reduction Co., Inc., New York City. Filed Aug. 10, 1948. Granted June 27, 1950.



Patent pertains to an electrode holder having a barrel portion with an outer tubular member. The tubular member has an inward and downward tapering interior surface near its lower end. A collet is located inside of the tubular member and moves coaxially in it. The collet has an opening to receive an electrode. It also has a conical surface on the collet jaws to engage the tapering inside surface on the outer tubular member. An inner tubular member has threaded engagement with the outer tubular member at the tip end of the barrel. When rotated it moves axially relative to the outer tubular member. The collet has an external shoulder on the jaws next to the upper part of the conical surface. The lower end of the inner tubular member extends down over and around the upper part of the collet. It engages the shoulder and a knob located at the upper end of the barrel and is connected to the upper end of the inner tubular member. The inner tubular member can be rotated to move it and the collet axially. Collet jaws clamp the electrode upon acting of the above parts.

* * *

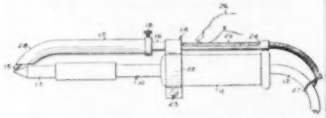
Welding Flux

2,507,751. ALVIN L. BENNETT, National City, Calif. Assigned to Solar Aircraft Co., San Diego, Calif. Filed Aug. 30, 1948. Granted May 16, 1950.

Newly patented fluxing powder consists of an unreacted mechanical mixture of powdered ingredients. They are, in anhydrous form by weight: calcium fluoride, 55-81%; sodium fluoride, 16-24%; lithium fluoride, 1-5%; borax glass, 2-16%, and boron oxide 2-16%.

Hand-Fed Soldering Iron

2,510,518. VICTOR M. POSADA. San Salvador, El Salvador. Filed July 15, 1947. Granted June 6, 1950.

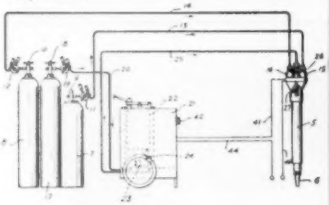


Patent pertains to a soldering iron which has a sleeve mounted gripping opening at its top. A clamp extends around the closed part of the sleeve and has arcuate gripping arms for mounting the sleeve on a soldering iron. A guide tube has an arcuate outer end slidably mounted on the mounting sleeve. A wire coil spring with a ring on the outer end is mounted in the sleeve. The inner end of the coil spring is formed to grip a solder wire so that the solder wire feeds outwardly. It also can be drawn inwardly with the operator holding the iron with the ring on the opposite end of the coil spring.

* * *

Cutting Torch

2,509,270. HOWARD G. HUGHEY, Fanwood, N. J. Assigned to Air Reduction Co., Inc., New York City. Filed Oct. 19, 1946. Granted May 30, 1950.



Recently granted patent covers an oxygen cutting or scarfing torch which has a flux feeder for putting flux into the oxygen passage. A conduit attached to the torch places a pressure-responsive device in communication with the oxygen passage on the downstream side of the oxygen valve.

* * *

Welding Electrode

2,512,430. THEODORE E. KIHLGREN, Berkeley Heights, N. J. Assigned to The International Nickel Co., Inc., New York City. Filed Aug. 3, 1949. Granted June 20, 1950.

Patent covers an electrode having a core wire of nickel base alloy and a flux coating having the following composition: (by weight) 24 parts calcium carbonate, 22 parts calcium fluoride, 25 parts cryolite, 20 parts ferro-50 columbium, 6 parts ferro-40 titanium, 3 parts bentonite and a water-dispersible binder.

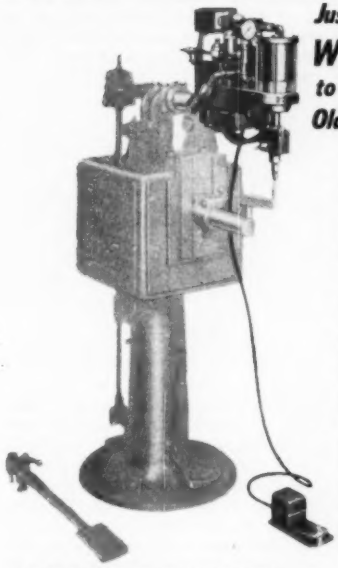
MORE SPEED than You Need—

Just Add

WELD-AIR-MATIC

to your

Old Rocker Arm Welders



Your present rocker arm spot welders can *really* produce *extra* profits—for all it takes is the simple installation of a compact Weld-Air-Matic. This self-contained control unit *air-powers* your welder—adds *speed, accuracy, ease of operation* never before possible with your present foot-operated welder.

Tests Prove 10,000 Welds Hourly on Continuous Daily Schedules

The Weld-Air-Matic provides a feather-touch foot switch that controls pressure and energizes a coil on a four-way operating valve. Employing reduced air pressure of 15 to 50 lbs., it has a maximum stroke of 1½" on size 1 unit, 2" on size 2, and 2½" on size 3 unit. Requires any standard Weld Timer and a minimum of 4 cubic feet air supply per minute, with 80 lbs. minimum line pressure. Three sizes available with all accessories mounted to one strong aluminum alloy casting.

Get the facts now on how you can break all previous production records with your present equipment, by modernizing with the new Weld-Air-Matic. You can't lose — for the savings you make will quickly account for Weld-Air-Matic's nominal cost.

DEALER TERRITORIES AVAILABLE—
Information on Request

WRITE TODAY FOR DETAILS

ROBT. W. HOFFMAN COMPANY, INC.

40 South Clinton Street **Chicago 6, Illinois**

Send For This

FREE BOOKLET TODAY!

—16 Pages of Authentic Information, Suggestions and Short-cuts!

"HOW TO CLEAN WELDS" is a valuable booklet — that will help you teach apprentices *quickly and correctly*. Also your experienced weldors will appreciate the many time-saving methods illustrated. It will help you prevent costly mistakes that waste metal and cause unnecessary delay. Send today for the copies you need and watch your profits grow through improved workmanship!

MAIL COUPON NOW!

CHICAGO MANUFACTURING & DISTRIBUTING CO.

1928 W. 46th St. **Chicago 9, Ill.**

CHICAGO MANUFACTURING AND DISTRIBUTING CO.

Dept. 10W 1828 West 46th St., Chicago 9, Ill.

Please send (.....) copies of "How to Clean Welds."

Name .....

Firm Name .....

Street .....

City..... Zone..... State.....

METAL BOND

SOLDERING
and
WELDING
PRODUCTS
—the choice of successful welders

SEAL-X-O

A preparation used for sealing air holes on electric welds on water jackets, etc. Can be used as a filler over rough welds. Where no tensile strength is needed it has many uses. This and all METAL BOND products can help you make more money on every welding job.

• Send for our pocket-size catalog. Contains information on welding, brazing, and soldering with descriptions of money-saving METAL BOND Products.

METAL BOND MFG. CO.
3201 KOSSUTH AVE.
ST. LOUIS 7, MISSOURI

W-AL-CO RODS
for Welding of ALUMINUM
ELECTRIC AND GAS WELDING

Drawn Wire
TYPES 25, 43 and 52
Brazing 716

FOR CAST ALUMINUM

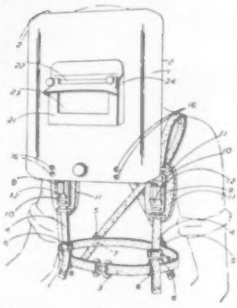
Use Extruded Rods
Types 142, 195, 355 and 356
for Better Welding
3/16" size only

Aluminum Solder
White Metal

Welding Alloys Manufacturing Co.
744 Broad St. Newark 2, N. J.

Weldor's Hood

2,505,640. STANLEY FITCH, Woodford Green, England. Assigned to Asea Electric, Ltd., London. Filed Sept. 9, 1947. Granted April 25, 1950.

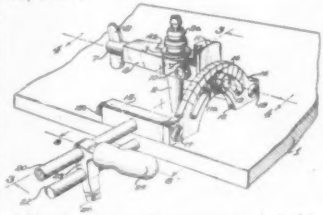


Patent pertains to a protective hood for weldors, grinders and men in similar occupations. It includes a body harness having a belt for the waist and straps for the shoulders. A slide member on each shoulder brace is vertically adjustable. A shield is detachably mounted on the sliders. A pivoted mounting next to the lower edge of the shield makes it angularly adjustable.

* * *

Cutting Torch Holder

2,514,741. LOUIS K. BULLMAN and SHIRL UNDERWOOD, Norfolk, Va. Filed March 15, 1948. Granted July 11, 1950.



Newly patented cutting torch holder is adapted to slide on the surface of the workpiece. It has a protractor plate with an arc slot of 180 deg; the latter is inscribed about the medial lengthwise axis of the holder. The bed plate has a threaded piece extending through the slot to be guided by it. A nut fitting the stud clamps the bed plate at selective positions along the arc. The bed plate also has a key portion. Around this, slotted clamps in the cradle that holds the torch tip can be fastened. This provides radial adjustment of the cradle relative to the arc slot. The cradle has a hole for holding the torch tip and means for clamping it. When the threaded stud acts with the arc slot to hold the bed plate aligned with the radii of the slot, the torch tip is directed toward the medial axis.

SPECIAL GLOVE DEVELOPMENT BY
RACINE

THREE STYLES

- 380 Horsehide
- 384 Pearl Carpincho (wildpig)
- 386 Cowhide

Chrome tanned Heat Resistant Split Leather—Wool Back Lining—LARGE size—

1. One piece back.
2. One piece palm.
3. Thumb seam protected by wide leather strap.
4. All vulnerable seams welted.
5. Palm side of thumb is protected by extra leather overlay.

• Send for booklet on these and other GARDSMAN Protective Equipment.

RACINE GLOVE COMPANY, INC.
RIO, WISCONSIN

Oakite's New Metal Cleaner

Oakite Compound No. 33 removes oil, rust, heat scale, smut, welding residues, marking inks and other soils from steel and aluminum. It prepares metal for painting. It does all these things *at the same time.*

It's a great soak cleaner; and great for hand-swabbing. It saves money; often eliminates pickling of moderately rusty steel.

FREE Write Oakite Products, Inc., 75 Thames St., New York 6, N. Y., for your copy of Folder F 7993 on *"Oakite Compound No. 33."*

OAKITE
SPECIALIZED INDUSTRIAL CLEANING
MATERIALS • METHODS • SERVICE
Technical Service Representatives Located in Principal Cities of United States and Canada

BUY

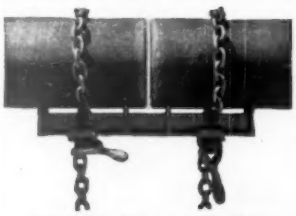
SELL

USE

SHAWINIGAN

CARBIDE

SHAWINIGAN
PRODUCTS
CORPORATION
EMPIRE STATE BUILDING
NEW YORK 1, N. Y.



WELD PIPE
Faster . . . Easier . . . Truer
WITH
JEWEL PIPE
CLAMPS

They align pipe perfectly and hold it secure for tacking. On in a minute—off in ten seconds. Two sizes, ½ to 8 in.—8 to 16 in. Rigid construction resists strain, heat, and abuse.

Other Jewel Clamps for Ells, long and short turn—for Flanges—for Headers. Also Pipe Marker, eliminates patterns for holes and saddles.

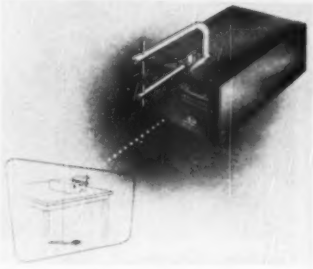
So simple—so easy to use—Jewel Tools are proving big time-savers in refinery piping fabrication and erection.

Write Today for Details and Prices

JEWEL Manufacturing Company
1841 University Ave.
ST. PAUL 4, MINNESOTA

NEW PRODUCTS

(*Continued from page 62*)



Lightweight Spot Welder Does Precision Weld Jobs

MANUFACTURERS of radio, electronic and television tubes, jewelry, surgical and dental instruments, optical equipment and other delicately made products should be interested in the new "Unimatic" industrial spot welder. Especially designed for precision production welding of light-gauge wire and sheet metal, this new bench welder is a stored-energy type of resistance welder with an extremely short time-constant. A 10-position selector switch allows a wide range of adjustment, and each setting provides a precise amount of energy to the weld. Even inexperienced operators can make burn-free welds without evidence of heat distortion, discoloration or splattering, states manufacturer.

A compact portable unit, the "Unimatic" is ready to operate when plugged into a standard 115-volt, 60-cycle outlet. Throat depth measures 6 in. Either pushbutton or foot-pedal actuates the welding.

UNITEK CORP., 697 N. Lake Ave., Pasadena, Calif.

* * *

New Bender Handles Irregular Shapes or Radii

NEW rotary-fixture machine bends irregular shapes or true radii in tubing, bars, extrusions or roll-formed sections up to 8-in. wide. It has a horizontal stationary pressure pad of either steel or bronze construction; pad is air-operated against a rotating type die head. The die head is mounted on a vertical spindle driven by a 7½ hp motor. The adjustable slide mounting of the air cylinder provides the capacity for bends up to 7 ft in diameter. Changeovers in tooling can be made by one man in about 30 minutes. The overall dimension of the machine is 4 by 8. Table height is 36 in.

PINES ENGINEERING CO., INC., 600 Walnut St., Aurora, Ill.

NOW-Save as much as HALF of every $ of Welding Costs!

Let your own experience PROVE you can enjoy All These Advantages With

ALL-STATE

Low-Temperature Welding, Brazing and Soldering Alloys and Fluxes

- Save up to 50% on heat
- Save up to 100% on dismantling
- Save up to 100% on reassembly
- Save up to 60% on time
- Save up to 80% on joint preparation
- Save up to 80% on amount of welding rod
- Save up to 100% on joint finishing
- Save up to 90% on preheating
- Save up to 100% on distortion
- Save up to 100% on warping
- Save up to 100% on burn-throughs

Many report savings up to 75% on Job Costs

Your own experience is the most convincing thing in the world. When you do it yourself you know you can do it again and again.

SAMPLER

The famous Doc Alloys Kit is a sampler of All-State products for torch application. It contains eleven types of All-State gas welding, brazing and soldering rods and appropriate fluxes, plus All-State galvanizing powder. There is everything, including ample supplies of silver solder, to weld anything — and, there's enough of everything to take care of a large number of jobs. Flux-coated as well as bare nickel-silver rods for brazing and build-up are furnished.

PRICE $15

SEND COUPON TODAY

I'LL PROVE IT TO MYSELF

All-State Welding Alloys Co., Inc.
273 Ferris Ave., White Plains, N. Y.

For the opportunity to see for myself the inherent advantages of low-temperature joining, I'll pay your distributor $15 when you have him deliver to me one of your Doc Alloy Kits.

SAVE 85%

of weld cleaning costs with PROTECT-O-METAL No. 2

Protect steel stored out of doors as long as 2 years with PROTECT-O-METAL No. 8

Protect-O-Metal No. 2 keeps weld spatter away from metal. After welding, spatter wipes off with a dry cloth. No wasted profits cleaning welds with air chisels, wire brushing or sand blasting. Protect-O-Metal No. 2 costs about 1/10c per foot of weld protected . . . saves up to three times its cost. Protect-O-Metal No. 8 keeps steel rust-free as long as two years under difficult storage conditions. When you are ready to weld . . . wipe dirt away and weld, no further preparation needed. Both compounds are smokeless . . . odorless . . . non-toxic. A trial gallon of either compound will be supplied for testing in your plant. Your money back if these compounds are not satisfactory.

G. W. SMITH & SONS, INC.
5408 Kemp Road, Dayton 3, Ohio

Combine Goggle with Respirator

AO No. 700 RUBBER-FRAME goggle has been combined with No. R2000 respirator to make a handy respirator-goggle unit that will protect the wearer against chemical sprays, light metal particles, dusts and gases. Goggle provides wide-angle vision.

Respirator filters out the various dusts or gases by means of specific cartridges or disc filters. The inhalation valve admits air freely at the lightest intake of breath, seals easily on exhalation. Valve design does not allow moisture to collect.

AMERICAN OPTICAL CO., Southbridge, Mass.

* * *

Hard-facing Electrode

OFFERED for building up of low or worn surfaces, the new "Ranite No. 4 Electric" leaves a slag-free deposit of metal of 45 Rockwell C hardness (at 800 F). Ultimate hardness ranges from 56 to 60 Rockwell C. The electrode is metallic-coated and has a core wire of high-alloy cast material. Operating characteristics are said to be unusually smooth, and a soft arc results on a-c or d-c, either straight or reversed polarity. Because of its metal coating, the electrode can be gripped anywhere along the rod length; it is not necessary to grip it in the center or at an end.

RANKIN MFG. CO., 3072 West Pico Blvd., Los Angeles 6.

* * *

Low-Cost Shop Grinder Has High-Quality Parts

THOUGH BUILT for general duty in machine shops, a new low-cost Delta grinder is claimed to have high-priced safety and construction features. These include two shatterproof safety glass shields, steel spark guard, tool rests adjustable to any angle. Housing, guards and base are cast iron. The grinder measures 20 in. from side to side with shields.

DELTA POWER TOOL DIVISION, ROCKWELL MFG. CO., Milwaukee 1.

SPECIALIZING IN "BETTER-BUILT"
WELDING & SAFETY EQUIPMENT
FOR OVER 25 YEARS

There is a DOCKSON distributor near you. Name on request.

Write for our complete Welding and Safety catalogs.

Dockson CORPORATION
3939 WABASH • DETROIT 8, MICH.

"Red Head"
WELDING CLAMPS

Designed for Welding

Made to take abuse

1. Threads are always protected from weld spatter, and never exposed to damage in open or closed position.

2. The clamp body is cut from a solid plate and heat treated to give greater resistance to bending or twisting.

3. Heat treated chrome molybdenum alloy handle offers great resistance to bending.

23 STOCK SIZES

CHICAGO BOILER COMPANY
1969 Clybourn Ave. Chicago 14, Illinois

DID YOU FORGET TO TELL US ABOUT YOUR CHANGE OF ADDRESS?

Don't risk missing a single issue of your WELDING ENGINEER subscription! If you are going to change your address, be sure to notify your local postmaster and let us know at least a month in advance. Use handy coupon below! Thanks for cooperating!

The WELDING ENGINEER
Circulation Department
330 West 42nd Street New York 18, N. Y.

MY NEW ADDRESS WILL BE:

Street .....

City .....Postal Zone No.....

State .....

Signed .....

OLD ADDRESS .....

.....

Be sure to include street address, City, Postal Zone Number and State in above.

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE

(Not available for equipment advertising)

90c a line, minimum 4 lines. To figure advance payment, count 5 average words as a line.

INDIVIDUAL EMPLOYMENT WANTED advertising rate is ½ the above rates, payable in advance.

PROPOSALS, 90c a line an insertion.

INFORMATION

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 1 line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE

The advertising rate is $8.75 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches —to a page. W.E.

NEW ADVERTISEMENTS received by October 16th will appear in the November issue, subject to limitation of space available.

WANTED— WELDING ENGINEER

Two states served from one of the South's largest cities. Has no automatic equipment for hard-facing. Old established welding supply distributor believes there is an excellent opportunity and will help you get started, throw business your way and extend credit if necessary. $5,000 investment required.

Gulf Welding Equipment Co.
1133 Magazine Street
New Orleans, Louisiana

Salesmen for All Territories

To sell welding cable—direct factory connection. Desirable opportunity for men with an established following in the welding industry.

Carol Cable Company
Division of The Crescent Co., Inc.
Pawtucket, Rhode Island

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION WANTED

SALES MANAGERS: Position Wanted—Salesman and demonstrator in electric and acetylene welding equipment and welding machines and welding alloys. Experienced with jobbers and industrial sales. Have a high sales record in acetylene and electric equipment and oxygen-acetylene sales. Living in Middle West. Will relocate. PW 7744, Welding Engineer.

SELLING OPPORTUNITIES OFFERED

SALESMAN: FOR Resistance Welding electrodes and machine. Phila. and East Penna. Established Distr. Salary and commission. Excellent opportunity. SW 7750, Welding Engineer.

SALESMEN ALL Territories: To sell limited line of supplies to jobbers only. Can be carried as a side line. Com. basis. SW 7595, Welding Engineer.

BUSINESS OPPORTUNITY

Wanted: Welding Supply Company

Prefer with oxygen and Acetylene Dealership but not absolutely necessary. Southern or West Coast Area given first consideration. BO 7312, Welding Engineer.

IF THERE IS

Anything you want

that other readers of this paper can supply

OR—

Something you don't want

that other readers can use, advertise it in the

SEARCHLIGHT SECTION

FOR SALE
WELDING RODS

All in Original Factory Cartons

AWS Numbers: E6010 — E6020 — E6030
E6011 — E7010 — E7020

Sizes:
1/8"—5/32"—3/16"—1/4"—5/16"—3/8"

Manufacturers:

McKay	Harnischfeger
Reid Avery	A. O. Smith
Hollup	General Electric
Champion	Lincoln
	Metal & Thermit

12,000# STAINLESS STEEL RODS

Type	307 — 5/32"
"	308 — 5/16"
"	308 — 5/32"
"	310 — 3/16"

20,000# HOLLOW ELECTRODES
Mild Steel — 5/16" x 14" with 1/8" Hole.

EASTERN SCRAP & SALVAGE CORPORATION
65 Muirheid Ave., Trenton 7, N. J.
Telephone — 5-6349

OXWELD CM-15s, Nat. So. Harris K's, Case S-34, AIRCO Oxy-graph, Camographs, Radiagraphs. SEAM WELDER, Progressive 150KVA, New. SPOT WELDER, National, 40KVA for Brass and Stainless. BRONZE STAINLESS, AMPCOTRODES. NO. 12 LENSES, ELECTRODE HOLDERS.

RALL SUPPLY COMPANY
119 E. 42nd St., NYC 17

Portable Air Products Oxygen Plant

One used Portable Plant, capacity 1,000 cu. ft. per hour, mounted on Semi Trailer, complete with engine and compressor. Two New Independent Engineering Company 02B Skid-Mounted. Oxygen Columns. Capacity 500 cu. ft. per hour.
Plant manufactured 1945.
Write for price to

INDUSTRIAL AIR PRODUCTS CO.
3200 N. W. Yeon Avenue Portland 10, Oregon

FOR SALE
LONGITUDINAL SEAM WELDER
THOMPSON-GIBB 150 K.V.A.

Like new. Approx. cost $12,000.00—Any reasonable offer will be considered. Full particulars on request.

ESSEX WELDING EQUIPMENT CO.
17-19 Tichenor Lane, Newark 5, N. J.

FOR SALE

500 Unused cutting torches, original packing. Brand: Airco.

Write for information

FS 7791, Welding Engineer,
330 W. 42nd St., New York 18, N. Y.

OXYGEN CYLINDERS FOR EXPORT

2,000 Oxygen Cylinders, 9" x 55", capacity 220 cu. ft., tested, excellent condition. Write or wire for prices.

INDUSTRIAL AIR PRODUCTS CO.
3200 N. W. Yeon Avenue, Portland 10, Oregon

STAINLESS STEEL ELECTRODES

at greatly reduced prices.

19,000 lbs.	3/32"	Page	18-8
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8,000 "	1/8"	Murex	25-20
4,000 "	1/8"	Arcos	18-8
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4,000 "	3/16"	Cu Zh Bronze	

All Electrodes packed for export.
Write for prices.

INDUSTRIAL AIR PRODUCTS CO.
3200 N.W. Yeon Avenue Portland 10, Oregon

PIPE AND TUBE CUTTING MACHINES

Twenty-five years' experience in building guided torch machines for making curved or angular cuts for welded fabrication.
Correspondence invited on any problem in cutting pipe or tubing from ¾" — .030 wall to 24" — 1" wall in steel, stainless, cast iron and non-ferrous metals.

FRANK J. DOUGLASS
412 So. California Ave., Monrovia, Cal.

FOR SALE

Thomson Model F2-5 KVA Flash Butt Welder, complete with Westinghouse ignitron tube contactor and auxiliary load resistor. Never been used. Priced reasonably.

HERFF JONES COMPANY
1411 N. Capitol Ave. Indianapolis, Indiana

WHERE TO BUY

ALLEN FLUXES
SODERING
BRAZING & WELDING
S. B. ALLEN CO. INC. Chicago 31, Ill.
6714 Bryn Mawr Ave.

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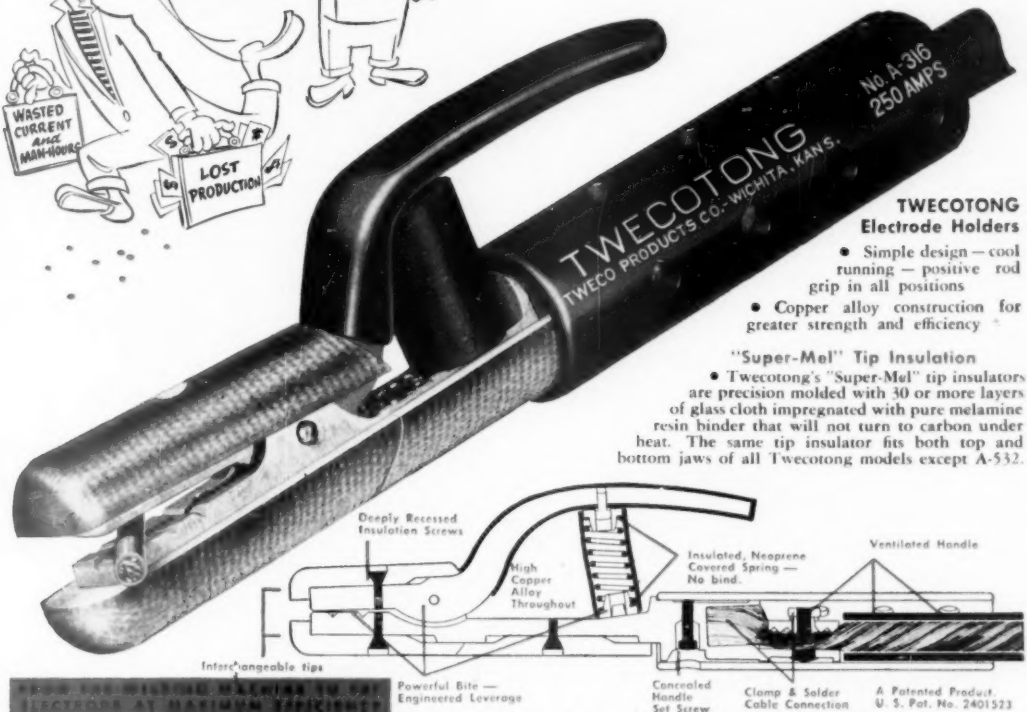
STOP WELDING LOSSES *with* TWECO CABLE Connections

The greatest waste of profit in any weldery is caused by lost energy in the welding circuit that results in lowered production and wasted man hours. Current losses in themselves are not vital but diminished profit from poor efficiency in welding circuits IS important and warrants investigation by top management. A Tweco bulletin on "Causes and Cures" for these deficiencies is available without obligation, just write for it.


TWECOTONG
TWECO PRODUCTS CO. - WICHITA, KANS.
No. A-316
250 AMPS
Deeply Recessed Insulation Screws
High Copper Alloy Throughout
Insulated, Neoprene Covered Spring — No bind.
Ventilated Handle
Interchangeable tips
Powerful Bite — Engineered Leverage
Concealed Handle Set Screw
Clamp & Solder Cable Connection
A Patented Product. U. S. Pat. No. 2401523

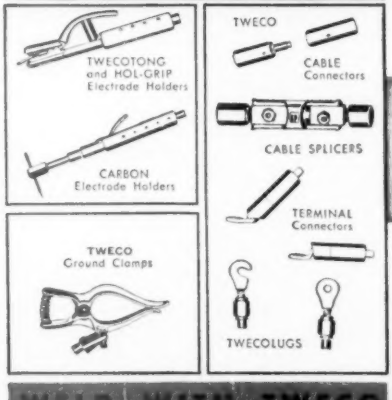
TWECOTONG Electrode Holders

- Simple design — cool running — positive rod grip in all positions
- Copper alloy construction for greater strength and efficiency

"Super-Mel" Tip Insulation

- Twecotong's "Super-Mel" tip insulators are precision molded with 30 or more layers of glass cloth impregnated with pure melamine resin binder that will not turn to carbon under heat. The same tip insulator fits both top and bottom jaws of all Twecotong models except A-532.

USE THE WELDING MACHINE TO GET ELECTRODE AT MAXIMUM EFFICIENCY



WELD WITH TWECO

The simple design and quality materials in TWECOTONG have been field tested for longer life, lower maintenance cost and better operator satisfaction. Save with TWECOTONG.

TWECOTONG SINGLE UNIT PRICE — WRITE FOR QUANTITY PRICES THEY SAVE YOU 10 TO 27%

Model A-38	Model A-14	Model A-316	Model A-532
500 AMPS for 3/8-3/32" rod	300 AMPS for 1/4-1/16" rod	250 AMPS for 3/16-1/16" rod	200 AMPS for 5/32-1/16" rod
$6.50	**$5.00**	**$4.75**	**$4.50**

Standard equipped with heavy duty "Super-Mel" insulations

Write for Twecolog #7 giving data and prices on the complete TWECO line of electrode holders, ground clamps and cable connections for electric welding.

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